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TRENTE-CINQ ANS DE PRATIQUE
de
PHYSICOTHÉRAPIE GYNÉCOLOGIQUE

(*Extrait de* la Médecine Internationale illustrée, *n° 8, août 1928.*)



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TRENTE-CINQ ANS DE PRATIQUE

de

PHYSICOTHÉRAPIE GYNÉCOLOGIQUE

Par le Docteur A.-Joseph RIVIÈRE O. ❋ ✿ C. ✠ (1).
(de Paris)

L'innocuité, généralement reconnue, de la physicothérapie, jointe à l'efficacité habituelle de ses procédés, lui ont assuré une certaine vogue pour le traitement des affections gynécologiques. Les résultats le plus notoirement obtenus sont dus à l'ionisation intra-utérine, à la diathermie, à l'actinothérapie, à la rœntgénisation. Nous avons trouvé souvent avantage à associer ces divers procédés, pour obtenir le maximum de résultats : analgésie, hémostase, antisepsie utéro-tubaire, régularisation de la circulation régionale, régénération des fibres lisses, résolution des œdèmes locaux, des engorgements et indurations.

Un traitement physicothérapique persévérant est, dans une large mesure, susceptible de réveiller la vitalité tissulaire des organes : je l'ai même constaté dans certains états d'inflammation chronique et de sclérose, qui avaient pu passer pour incurables. Enfin, la cicatrisation des ulcères simples du col s'opère, plus rapide et plus complète qu'avec les anciennes méthodes de traitement.

I. — SYNDROME GYNÉCOLOGIQUES

Deux syndromes se plaisent à compliquer les gynécopathies : la neurasthénie et l'atonie gastro-intestinale. Bain statique, effluve alto-fréquente et ultra-violet dans le premier cas ; diathermie et actinothérapie, dans le deuxième, remédieront à ces désordres du nervisme et de la digestion, à la condition expresse d'activer la fonction épuratrice du foie, qui commande toute la sphère cœliaque. Par ces bienfaisantes interventions, se guérissent habituellement les « fausses utérines », qui ne sont que des névropathes à localisation pelvienne. Elles voient s'évanouir, peu à peu, leurs utérus « irritables », leurs hypéresthésies ovariennes, leurs névralgies lumbo abdominales.

La physicothérapie (c'est toujours ainsi que je l'ai envisagée) ne saurait borner ses effets curatifs aux états locaux. Ce qu'elle doit surtout viser, c'est la modification du terrain dyscrasique, l'amendement de la diathèse arthritique et phlogogène, la suppression du nervosisme et de l'anémie, la guérison de l'intoxication cellulaire. Il y a 44 ans, dès la soutenance de ma thèse inaugurale *Du Positivisme en Médecine* (Nervisme-Névrarchie) devant la Faculté de Paris (1884), j'ai conçu, sur ces larges données, cette théorie, qui a servi de fanal à toute ma vie de praticien : l'agent physique vient impressionner les nerfs centripètes périphériques, dont l'excitation se transmet aux neurones et aux vaisseaux de la région malade. Telle est, à notre avis, la genèse d'action thérapeutique de la physicothérapie.

(1) Cet article, extrait de la *Médecine Internationale Illustrée*, n° 8, août 1928, est le résumé d'une importante communication faite au Congrès annuel de l'Association des Gynécologues américains, à Chicago, septembre 1926.

II. — DÉSORDRES UTÉRINS. — IONOTHÉRAPIE

La dysménorrhée, qu'elle soit spasmodique, congestive, inflammatoire ou même membraneuse, est essentiellement justiciable de la physicothérapie. La diathermie, cette chaleur pénétrante, si fertile en heureux résultats, dans tant de cas, associée avec la galvano-faradisation localisée, aura souvent raison des douleurs menstruelles les plus rebelles.

J'ai vu, maintes fois aussi, ce traitement triompher d'aménorrhées qualifiées « irréductibles ». Dès 1910 (au Congrès de Saint-Pétersbourg), je notais que l'application abdominale de l'ultra-violet régularise le flux cataménial, combat la névralgie ovarienne, le prurigo pudendi, etc. Je ferai remarquer, en passant, que les interventions de la physicothérapie sont analgésiques et antiseptiques, ce qui ne dispense nullement, d'ailleurs, de pratiquer cette asepsie parfaite que la chirurgie nous impose aujourd'hui.

Il y a plus d'un quart de siècle que je traite par l'ionisation intra-utérine et les trois formes de haute fréquence (effluvation, scintillation et diathermie), les métrites cervicales et endo-cervicales, les cols mous et violacés, affligés d'ectropions ou d'œufs de Naboth, à orifices béants, à réactions inflammatoires plus ou moins graves.

Les troubles de la menstruation, utérus infantiles, insuffisances des règles ou aménorrhées, polyménorrhées et ménorrhées, crises intermenstruelles, déséquilibre ou modifications diverses du molimen cataménial et aussi du sens génital (vaginisme, stérilité), les congestions utérines et annexielles, les diverses métrites, les écoulements d'origine vagino-utérine, tubaire et vestibulaire, les syndromes sensitifs de la sphère génitale sous la dépendance de l'innervation pelvienne (névralgies, coliques utérines, prurit, coccygodynies, perturbations ovariennes diverses) — tous ces désordres, souvent plus fonctionnels que lésionnels, qui entravent et empoisonnent l'existence féminine dans ses diverses phases, nous ont paru, dans bon nombre de cas, justiciables des pratiques ionothérapiques.

III. — LA DIATHERMIE EN GYNÉCOLOGIE

Le pouvoir antiphlogistique et sédatif de la diathermie se manifeste contre toutes variétés de métrites, pour diminuer plastrons et exsudats, restituer la mobilité utérine, activer les processus cellulaires biochimiques et attenter à la vitalité des micro-organismes infectieux. La diathermie possède aussi une valeur hémostatique, coagulante, stérilisante et destructive, sur les éléments néoplastiques. Je crois équitable de rappeler ici que j'ai été le premier à signaler l'électivité cytolytique de la scintillation et de la transthermie alto-fréquente sur les éléments constitutifs des néoplasmes (voir mes communications au premier Congrès international d'électrologie et de radiologie médicales, Paris, juillet-août 1900, et « la Physicothérapie appliquée à la guérison du cancer », Académie de médecine, 8 décembre 1903).

La diathermie utérine ou vagino-abdominale agit favorablement sur les pertes : elle stérilise automatiquement les germes infectieux, dans les cervicites chroniques. L'application transthermique donne, en effet, dans les tissus, une température de 45°, à laquelle ne résistent ni gonocoques, ni streptocoques, ni colibacilles : si la purulence persiste, elle ne recèle plus aucun germe vivant, après les irradiations.

La cavité du col se trouve favorablement modifiée par l'étincelage alto-fréquent (électrode condensatrice de Oudin). Dans les métrites parenchymateuses, compliquées ou non d'adhérences ou de cellulites, on doit appliquer l'ionisation intra-utérine à l'aide de tiges métalliques (cuivre, argent, fer, de vingt à cinquante milliampères, pendant dix à vingt-cinq minutes)

La cure des métrites s'opère ainsi, sans choc ni réaction postopératoires, sans troubles dans les occupations, sans rétraction cicatricielle ultérieure. Loin d'être des méthodes pénibles, l'ionisation et la diathermie possèdent, grâce surtout à la chaleur électro-chimique, un pouvoir dolorifuge et analgésique spécifique. En traitant ainsi, à temps, la salpingo-ovarine, on évitera fréquemment l'intervention chirurgicale : en tout cas, on aura l'avantage de combattre les formes douloureuses de la salpingite. Il va sans dire que le repos au lit, les laxatifs, les injections chaudes antiseptiques et abondantes, les bains généraux, les lavements,

les tampons et ovules glycérinés, facilitant l'élimination du muco-pus, continuent à dominer le traitement et conduisent graduellement à l'extinction des poussées inflammatoires.

Lorsqu'il s'agit d'infections utérines liées à la rétention post-puerpérale ou post-abortive, il faut toujours intervenir chirurgicalement.

Il en est de même pour le traitement des suppurations pelviennes, phlegmon des ligaments larges, collections suppurées du Douglas, pelvi-péritonites suppurées. Chaque fois qu'il y a du pus, la physicothérapie devient insuffisante et la chirurgie doit entrer en scène. Toutefois, dans l'atrésie du canal utérin, on peut agir utilement par l'électrolyse négative, qui triomphe, assez souvent, de la stérilité (Ménard, Flateau), surtout si l'on ajoute à ce traitement local, des irradiations actinothérapiques générales et de la diathermie, qui se montre parfois héroïque pour un heureux retour des règles, préparant la fécondation ultérieure.

La chaleur créée par la diathermie dans le vagin et ses annexes a ordinairement raison des crises menstruelles douloureuses, des hypéresthésies ovariennes, du vaginisme invétéré, etc. Grâce au drainage vasculaire et à la stimulation nerveuse, un opportun coup de fouet est donné aux échanges, une modification sérieuse est imprimée à la nutrition intime des cellules, avec sédation parallèle des extrémités nerveuses. Les séances diathermiques (20 à 30 minutes en général) procurent aux utérines l'euphorique sensation d'une agréable chaleur interne, coïncidant avec l'apaisement de l'élément douleur.

Par leur résistance, les tissus électrisés transforment le courant en énergie calorifique, à une vitesse réactionnelle estimée à 300 millions d'oscillations par minute. Grâce à sa disposition providentielle, le vagin offre, au physicothérapeute, un champ de manœuvre idéal, pour ce dégagement énergétique de l'endothermie. Mais la voie rectale et la paroi abdominale elle-même peuvent aussi nous servir, concurremment, dans bien des cas. Reclus ne préférait-il pas, avec raison, dans l'œuvre décongestive, le grand lavement chaud aux injections elles-mêmes ? Et le cataplasme n'a-t-il pas conservé toute sa valeur antiphlogistique ?

IV. — L'ACTINOTHÉRAPIE

L'actinothérapie influence aussi heureusement les gynécopathies, améliore l'aménorrhée, combat les troubles de la ménopause naturelle et artificielle et atténue les vomissements incoercibles de la grossesse. On cite encore, à l'actif des rayons ultra-violets de nombreux succès contre la stérilité en général. Mais je conseille formellement de ne jamais borner l'actinothérapie aux rayons ultra-violets. L'infra-rouge doit alterner, surtout pour le traitement des métrites congestives, salpingites, prurit vulvaire, etc.

Berry considère l'ultra-violet comme un armement de premier ordre en gynécologie, surtout dans les métrites avec ulcérations profondes. S'il s'agit de femmes jeunes encore, chez lesquelles la fonction plasmatique et la restauration globulaire sont promptes à se réveiller, l'actinothérapie active et équilibre le fonctionnement utéro-ovarien, régénère les forces des anémiques, des hémorragiques et même des cachectiques, améliore l'appétit et l'assimilation, stimule le métabolisme des échanges et l'ampliation respiratoire, concilie un sommeil réparateur et reconstruit, finalement, la santé féminine dans son intégralité.

Ce qui frappe, d'ailleurs, les observateurs des traitements physicothérapiques en général, c'est la reprise de l'énergie et du courage, le teint frais et avenant, la suppression de l'insomnie, de l'instabilité, de l'excitation et des tendances hypocondriaques, bref le rajeunissement de toute l'économie. On conçoit, dans ces conditions, la vogue, toujours croissante, de nos méthodes, en gynécothérapie courante.

Nombre de douleurs céphaliques et de troubles psychasthéniques (dépression, lypémanie, mélancolie), qui sont en relation bien connue avec le dysfonctionnement génital, dans le sexe féminin, se trouve ainsi corrigés, à la faveur du traitement par les agents physiques.

V. — LE FIBROME UTÉRIN.

Malgré son incontestable activité, malgré la précision possible de sa localisation et de son dosage, la méthode ionisatrice et chimiocaustique d'Apostoli, contre les fibromes, a été peu à

peu abandonnée, à l'heure présente, pour faire place à la rœntgenthérapie, qui a l'avantage incontesté de diminuer plus promptement le volume des tumeurs et d'imposer silence aux hémorragies. Ce sont surtout les fibromes mous (même lorsqu'ils sont très gros) qui subissent la régression la plus notable, à la suite des irradiations. Les fibromes pédiculés demeurent justiciables de la chirurgie, ainsi que ceux dont le volume et la dureté sont cause de compressions inquiétantes.

Dans ma pratique habituelle, aux séances de rœntgenthérapie, j'associe le plus souvent l'ionisation intra-utérine, les rayons ultra-violets et la diathermie. Cette dernière a pour but d'éloigner les menaces d'infection. Les rayons Rœntgen, les courants continus et l'électro-thermopénétration commandent cette méthode combinée, que j'applique depuis nombre d'années contre le fibrome. Elle a l'immense avantage de n'exposer à aucun accident.

Nous associons, en résumé, la diathermie avec la radiothérapie hebdomadaire et l'ionisation intra-utérine, pour une cure indolore et même dolorifuge. Il s'agit d'une méthode prophylactique, qui réalise, par ionisation et catalyse, un traitement interstitiel, essentiellement hostile aux néoplasmes et empêchant probablement la métamorphose d'hyperplasies bénignes en dégénérescences malignes ; méthode essentiellement préventive des migrations et infiltrations néoplastiques, chez les diathésiques (1).

Ce qui impressionna, dès l'abord, les premiers expérimentateurs de ces méthodes, c'est le pouvoir inhibiteur des irradiations et de l'ionisation cuprique sur les pertes sanguines. La disparition de toute métrorragie coïncide avec la réduction du volume des fibromes. Les séances radiothérapiques sont quelquefois suivies, chez les femmes encore jeunes, d'une ménopause anticipée. Mais lorsque les ovaires ont été épargnés, l'arrêt des règles n'est que temporaire. S'il arrivait d'observer une reprise du fibrome, quelques séances de rœntgenthérapie suffiront pour en amener la régression désirée.

Le fibrome hémorragique de moyen volume et l'utérus fibromateux, à cellules toujours si radio-sensibles, bénéficient couramment de notre méthode combinée, étonnante pour son innocuité et pour son efficacité, à tous les âges de la femme.

Chez la femme déjà âgée, la ménopause artificiellement obtenue par les rayons devient définitive. Mais chez la femme encore jeune, il est possible de combattre le fibrome sans stériliser les ovaires ; c'est une question de technique. On reprendra le traitement dans la suite, si la menstruation tend à redevenir ménorragique (même s'il s'agit d'un petit fibrome ou d'un simple utérus fibromateux). Une collaboration étroite du radiologue et du chirurgien gynécologue est, d'ailleurs, avantageuse dans bien des cas.

VI. — LES INCIDENTS DE LA MÉNOPAUSE

Les incidents de la ménopause consistent surtout en des troubles congestifs (bouffées de chaleur, étourdissements, bourdonnements d'oreilles, désordres vaso-moteurs variés, sudations, excitabilité marquée du grand sympathique, palpitations, doigt mort, algies, érythèmes, insomnie, amnésie, obésité). L'orientation thérapeutique doit parer alors au déséquilibre endocrinien et neuro-végétatif. On instituera le régime peu azoté, avec l'eau pure en boisson, la vie au grand air, les purgations fréquentes (par le calomel, l'huile de ricin, le sulfate de soude). Les extraits thyro-ovariens rendent ici parfois de réels services. Contre l'asthénie, l'hypertension et la vagotonie, nous préconisons les rayons ultra-violets, les bains statiques et la d'Arsonvalisation. Ces trois agents, combinés intelligemment, s'opposent au déséquilibre endocrino-sympathique par anovarie, ainsi qu'à certains phénomènes spasmodiques, inquiétants pour la malade et son entourage : dyspnée d'effort, angor, cryesthésies et algies

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(1) Voir nos Communications : Traitement des fibromes et prévention des néoplasmes par la physicothérapie, XIVe Congrès international de médecine, Madrid, 1903.

Importance de la physicothérapie en gynécologie, Ve Congrès international de gynécologie, Saint-Pétersbourg, septembre 1910.

Contribution à la physicothérapie des affections utérines : *loc. cit.*

des extrémités, altération du teint et décoloration des muqueuses, tendances syncopales, insuffisances hépatique et rénale. Contre l'hypertension simple, Sergent préconise la rœntgenthérapie des surrénales et Borak celle du thyroïde.

VII. — CANCER UTÉRIN

Coup d'œil rétrospectif.

Le premier, j'attirais l'attention du corps médical sur l'activité cytolytique élective anticancéreuse des diverses modalités du courant de haute fréquence, au premier Congrès international d'électrologie et radiologie médicales de Paris, juillet et août 1900. Suivant les cas, je recommandais, isolément ou simultanément, à des degrés variables d'intensité, la transthermie, l'étincelage ou l'affluvation alto-fréquente. Ces méthodes furent, plus tard, débaptisées sous les vocables de : fulguration, électro-coagulation, dessiccation et diathermie.

Je détache dans cette communication ancienne, deux observations concernant spécialement la pathologie utérine (Comptes rendus des séances du premier Congrès d'électrothérapie et de radiologie, par le professeur Doumer, secrétaire général) : « J'ai soigné deux épithéliomas inopérables de l'utérus : le premier, à l'aide d'aiguilles de platine implantées dans les fongosités et reliées à l'extrémité du petit solénoïde (ce premier modèle de d'Arsonval donne l'électro-coagulation vraie).

« Les résultats ont été les mêmes dans l'un et l'autre cas : écoulement abondant de sérosité sanguinolente, pendant et après l'opération. Après quelques séances, chute des fongosités, sous forme de produits nécrobiotiques. »

D'une documentation ultérieure, faite à l'Académie de médecine le 8 décembre 1903 : « La physicothérapie appliquée au traitement du cancer », je rappellerai :

L'observation V : Epithélioma utérin récidivé.

« Mme V... 51 ans, a été opérée, en 1900 ; amputation du col, pour épithélioma végétant sur une cicatrice d'ectropion ancien. En janvier 1901, elle se présente à mon cabinet avec tous les symptômes d'une récidive avancée. Le diagnostic clinique avait été fait par deux de nos maîtres, à Paris et à Bruxelles. Je traite Mme V... par une série de vingt expositions de cinq minutes aux rayons actiniques et quinze minutes de courant de haute fréquence. On assiste à la cicatrisation progressive des ulcérations. Le suintement ichoreux nauséabond disparaît d'abord ; puis, les pertes de sang, qui étaient hebdomadaires, cessent de se produire. A ce moment, je provoque l'irradiation rœntgénienne avec un spéculum métallique. Douze séances suffisent pour faire disparaître tout aspect végétant du col. En deux mois, la guérison semblait définitive et l'état général, excellent garantissait la plénitude du succès. »

Après avoir parlé, dans l'observation I, de la disparition d'un lympho-sarcome profond avec généralisation au visage, au cou et aux bras, à l'aide de l'action combinée des rayons de Rœntgen et des effluves de haute fréquence, j'ajoutais :

« Les résultats curatifs s'obtiennent d'autant plus rapidement qu'on a employé des doses massives de rayons Rœntgen.

« Seule, une grande expérience permet de déterminer la qualité ou le degré d'intensité de ces rayons, ainsi que la distance où doit se placer le foyer, suivant la profondeur et la nature des tissus, et des organes traversés, et à influencer thérapeutiquement. Une dermatite légère favorise la régression de la tumeur, mais il convient, à tout prix, d'éviter la radiodermite ulcéreuse, De là, la nécessité pour l'opérateur d'être bien certain de son outillage et maître de son foyer radiogène. »

« Au sujet de la remarquable efficacité de la radiodermite observée sur notre malade atteinte de lympho-sarcome généralisé, je me permets d'insister sur la grande utilité de l'élimination des poisons organiques chez les cancéreux dont les reins témoignent d'une insuffisance notoire. Ne nous est-il pas arrivé, nombre de fois, d'observer un cancer remplaçant soudainement d'autres manifestations arthritiques ? c'est, à notre humble avis, la preuve que le carcinome constitue fréquemment une manifestation, tardive et maligne, d'un état arthritique latent depuis des années. Aussi avons-nous tou-

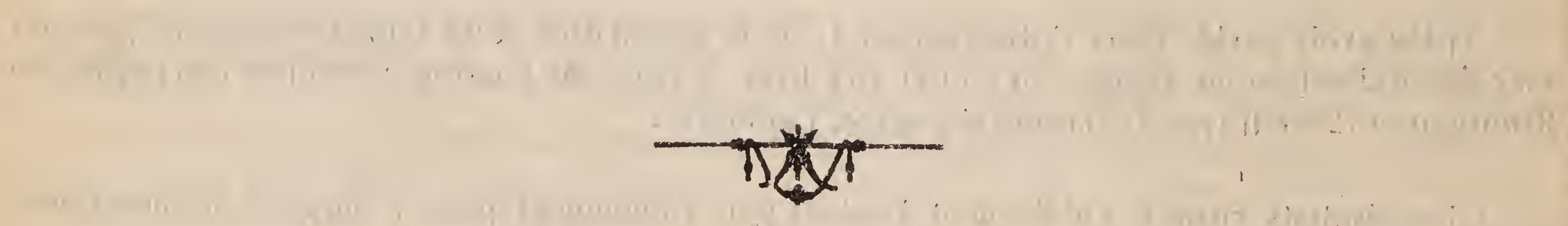
jours tenu à pousser, par nos agents physiques et par l'usage de certains moyens héroïques (calomel, quinine, salicylate de soude, huile de ricin, sulfate de soude, eau) aux éliminations organiques nécessaires, et à la lixiviation générale des tissus et des tumeurs pathologiques. Il suffit souvent à notre organisme, cette merveilleuse machine, qui possède le grand privilège de se nettoyer elle-même, d'une aide passagère pour se libérer de déchets et de poisons accumulés à la suite de vices alimentaires et hygiéniques, de perturbations physiques ou morales. Le concours synergique des autres organes se charge, alors, de redresser la fonction nerveuse trophique, momentanément déviée. »

Cette communication, faite à l'Académie de médecine, sous la présidence du professeur Lancereaux, a été publiée et envoyée par moi, il y a vingt-cinq ans, à plusieurs reprises, à tous les médecins de France et de l'étranger. Je ne trouve rien à y ajouter, aujourd'hui, si ce n'est que l'utérus est peut-être l'organe qui se prête le mieux à l'extirpation totale. Mais il faudrait, à mon sens, toujours accompagner et faire suivre l'opération par des séances de scintillation alto-fréquente et de radiations Rœntgen, dans le but d'éviter la récidive. Le couteau diathermique assure une stérilisation indispensable des tissus circonvoisins.

Je dois rappeler que mes observations, lues à l'Académie de médecine en 1903, étaient appuyées de la présentation de malades et d'examens histologiques.

Pour moi, il reste acquis que le succès thérapeutique ne s'obtient qu'autant qu'à la physico-cytolyse complète, on surajoute le traitement général de désintoxication, dont je parlais déjà en 1903, à l'Académie de médecine. Convaincu, dès cette époque, de l'analogie des radiations du radium et de celles des rayons X, je fis acquisition du premier radium susceptible d'être acheté et je l'utilisai aussitôt dans l'œuvre de destruction de la cellule cancéreuse. Le maniement du radium me semblant d'un dosage difficile, je n'ai pas continué la radiumthérapie, étant donné que ma méthode m'avait fourni des résultats suffisamment probants. La banque du radium, qui fut créée dans la suite, monopolisa en quelque sorte la médication nouvelle, qui ne faisait que confirmer mes premières prévisions.

La thérapeutique à laquelle j'ai, depuis vingt-huit ans, accordé ma confiance, est aujourd'hui classique, aux Etats-Unis, sous les noms de dessiccation et de chirurgie diathermique. Elle ne compte plus ses succès contre certaines variétés de néoplasmes. Le couteau diathermique est venu remplacer avantageusement l'aiguille de platine reliée au petit sclénoïde de d'Arsonval, permettant de mieux obtenir l'action diathermique destructive. La radiothérapie, elle aussi, est devenue plus pénétrante, grâce au perfectionnement apporté aux appareils.



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With the compliments
of Victor Robinson

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JOHANNES EVANGELISTA PURKINJE
(1787-1869)

By Dr. VICTOR ROBINSON
EDITOR OF "MEDICAL LIFE," NEW YORK

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To tarry at a discovery to its complete exhaustion, a discovery which casts a glamour about other names, was not Purkinje's habit. Driven from one discovery to another, he leaves the details to others; his works are stimulating data for further research. In addition, there are two rare qualities in this exalted spirit: respect for the youngest of talents, and modesty in not speaking of himself: both of these go with his noble character, but they are also to blame for Purkinje's achievements not being honored as they should be.

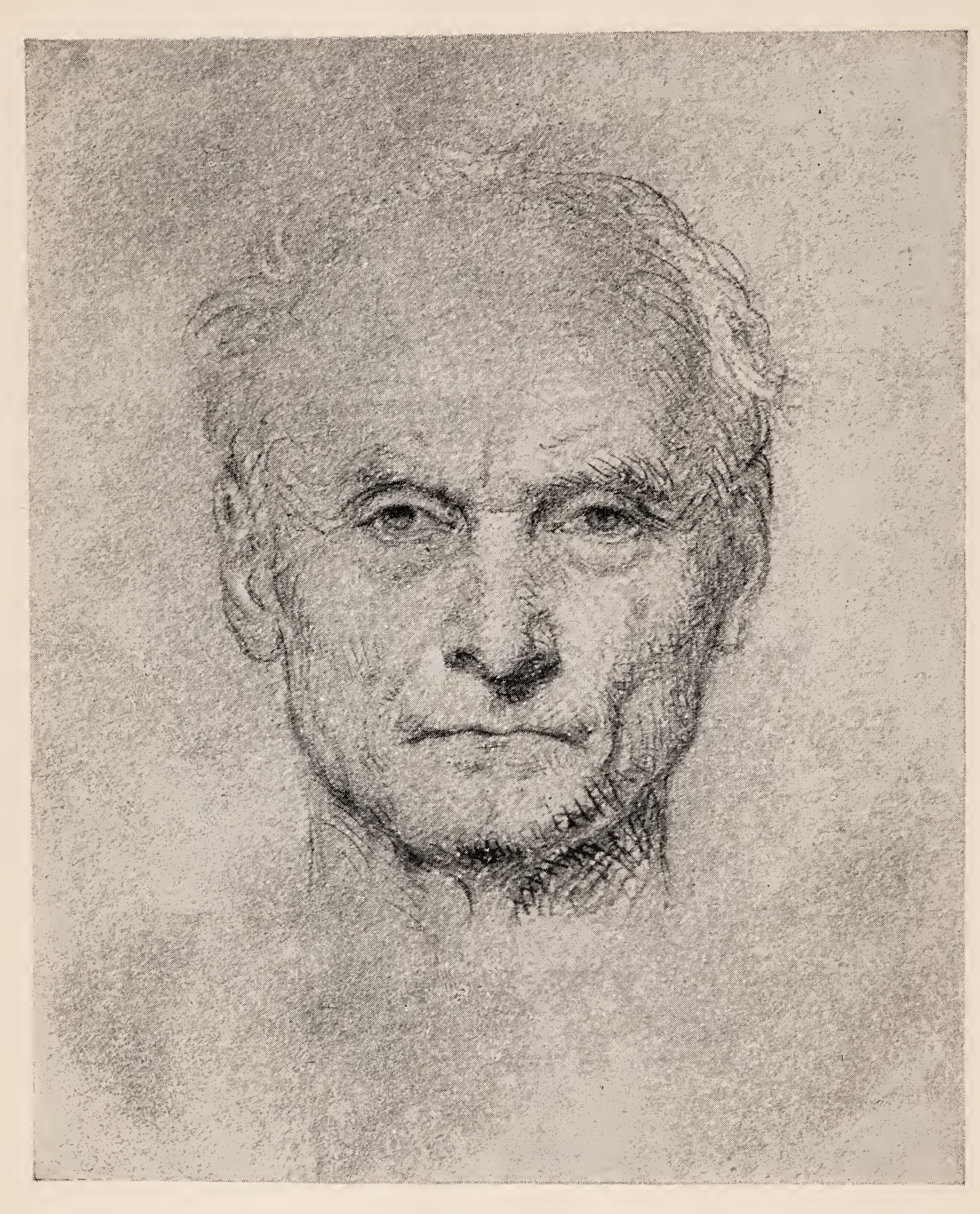
—*Th. Eiselt, 1859*

THE village of Libochowitz is not on the average map, but it lies near Leitmeritz on the Elbe, a town situated amid such natural beauty that it is known as the Bohemian Paradise. Man has ever done his utmost to despoil all earthly paradise, and during that terrible period which history calls the Thirty Years' War—when a whole generation of humanity shed its blood over myths—most of the families that still remained above ground departed from this region.

The call of the soil is strong, and though the plow turn up bullet and skull, corn grows well on land that has been watered with blood. The healing years passed over Libochowitz, and the fields of Baron Herberstein were under the care of Agricultural Official Purkinje. His family must have occupied quarters in the baronial home, for here his wife, Rosalie Safranek, gave birth to her son Jan on December 17, 1787. Thus Johannes Evangelista Purkinje came into the world in the castle of Libochowitz, and not in a "peasant's hut," as is stated by R. Burton-Opitz and others. For purposes of biography, it is more interesting to be cradled in a peasant's cottage than in a nobleman's palace, but history is inexorable.

The young Purkinje attended school in his native village, and took lessons in music and singing, in accordance with the Czech fashion of those days. His voice paved the way for his further education, and he was sent as a chorister to the Piarists in Moravia, where he devoted himself to philology. He graduated from the normal school in Mikulov, and then completed the course in the gymnasium. When it became necessary to select a profession, Purkinje found that he had grown accustomed to the Piarists and was attracted to pedagogy, and for these reasons entered the Order of the Piarists as a teacher of ancient languages. His novitiate year was spent in Stará Voda near the Silesian border, whence he was transferred to Stražnic; after 1806 he proceeded to Litomyšl—all little towns which mean nothing to the reader unless he be Czech. The peace of monastic teaching must have appealed to him in many ways, yet he did not take the vow, and Fichte lured him from the monastery to the university. He had already learned French and Italian—later supplemented by various other modern tongues—and had read widely.

He bade farewell to the Piarists, and came to his country's capital to study philosophy. At Prague he occupied himself also with literature, and for a time thought of becoming a man of letters. He was as frugal as David Hume, and the meager fees he received by tutoring enabled him to live, for in those days scholars possessed the secret of subsisting on ideals. His chief pupils were the young barons, Schutterstein and Ferdinand Hildeprandt; Purkinje



PURKINJE
By Joseph Mánes

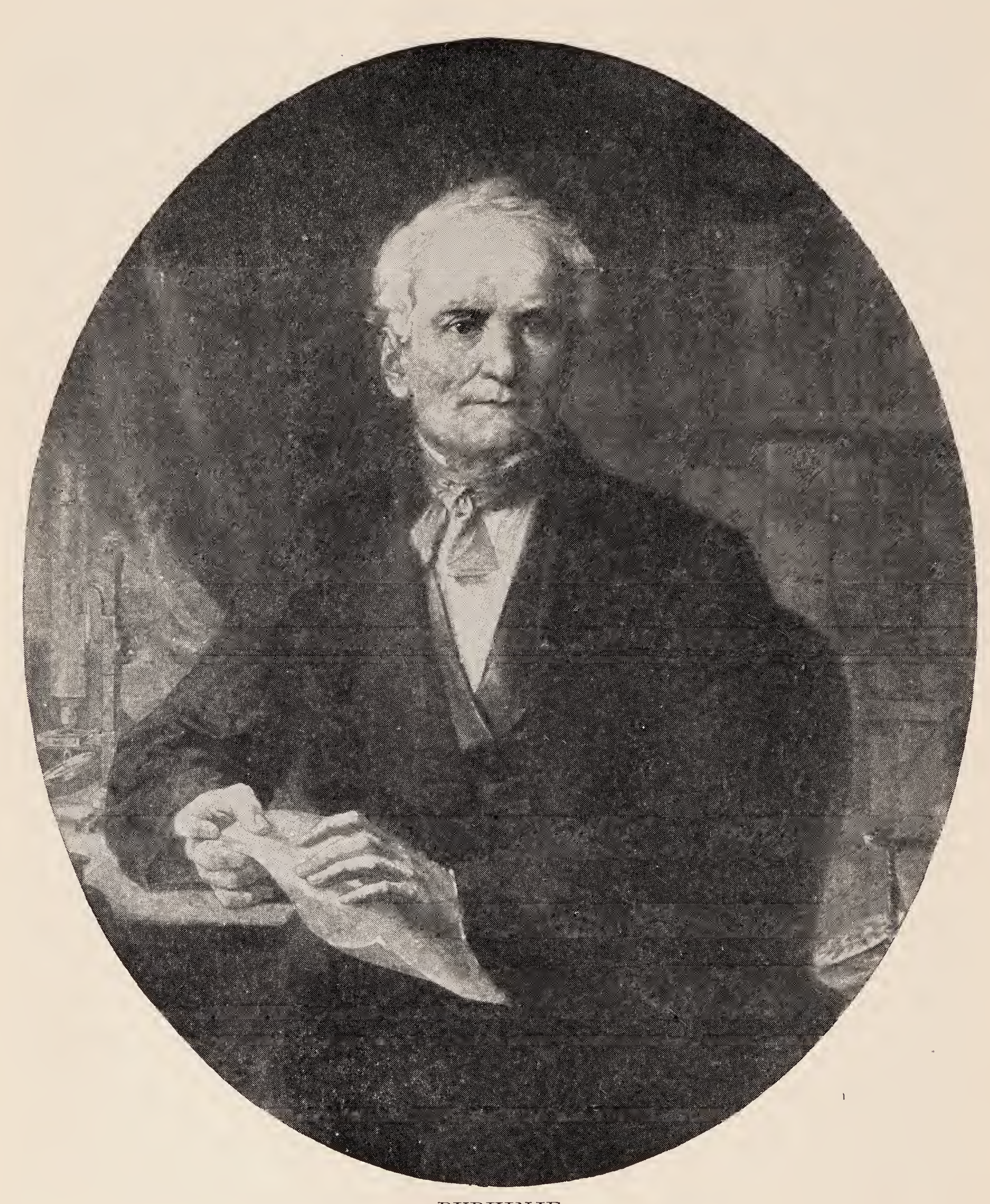
looked forward with keen pleasure to accompanying the latter to the Stavnic Mining Academy in Slovenia, but his dream was shattered when Hildeprandt joined the allies in the campaign against Napoleon.

Well-educated but still without a profession, Purkinje now decided upon medicine. It was never his intention to become a practicing physician, but he felt that the medical sciences would give him an insight into nature. Even toward the conclusion of his medical studies, the pedagogue's mantle clung to him, and he thought of asking the aid of the Hildeprandt family to establish a special teaching institution of the natural sciences, and he contemplated a visit to Switzerland to acquaint himself with the methods of Pestalozzi and his disciples. In 1818 he acted as assistant in anatomy and physiology under Rottenberg and Ilg, and in 1819 graduated with a dissertation on the subjective aspects of vision. He was already thirty-two years old, an age at which many famous scientific careers have closed.

The year 1819 was a troubled one for German students. August von Kotzebue, not content with his popularity as a playwright, had returned from Russia to his fatherland in the capacity of the czar's spy. Establishing a weekly newspaper, he ridiculed the students for their national aspirations, and especially mocked their efforts to secure free institutions. A clever man, the columns of his journal were funny and cruel, but a certain theological student had no sense of humor and killed him. The dagger of Karl Sand gave Metternich his opportunity to muzzle all Germany. Freedom of speech and press were abolished by the Carlsbad Decrees, students were condemned to death for wearing a ribbon, private papers in private houses were searched without warrant, journalists went into hiding, the naturalist Oken fled to Switzerland, professors and pupils emigrated to America and privy councillor Wilhelm von Humboldt, throwing down his portfolio in despair, relinquished politics forever to devote himself to the mysteries of the Basque tongue and the old Kawi language of Java. Wise Wilhelm von Humboldt! It is always a relief to turn from the world to the cloisters of culture.

In this year the bitter genius of Schopenhauer gave to the German people his masterpiece, but they were in no condition to read the "World as Will and Idea." They paid more attention to a pamphlet written by Hartwig Hundt, later suppressed by the censorship, in which the novelist made the suggestion, "As for the children of Israel, let them be sold to the English who could employ them on their Indian plantations instead of the blacks. In order that the tribe may not increase, let the men be emasculated, and their wives and daughters lodged in the houses of shame." In times of reaction, all sorts of ideas come to people's heads. Through the turmoil and general consternation, one man remained Jove-like, aloof, serene, going forward with his love affairs and work: Goethe, unperturbed by Napoleon, was unaware of Metternich. Among innumerable other activities, carrying on his researches in colors, Goethe read Purkinje's thesis with admiration, admitted that it stimulated him greatly, and quoted it frequently. The Bohemian physiologist, like the rest of the world, came to the oracle at Weimar, and Goethe was astonished at his personality and devotion to science. "Such an autodidactic and self-tormenting, talented Piarist," said Goethe, "represents a strange contrast in the midst of the Protestants." It was inevitable that among Goethe's crowded laurels should be entwined this leaf:

> I have taken the liberty of dedicating to you the second edition of my researches on "Sight from the Subjective View-point," since I could not resist making my strenuous mental efforts a memorial of my sentiments. Let us disregard



PURKINJE
Oil Painting by Peter Maixner

the fact that the work has been reprinted at the same time in a medical journal; this was not according to the original intention, and is a tribute which my poverty has been compelled to pay to booksellers as the manuscript wandered around hopelessly for a year. I hope this little volume will stir up a little more the phlegmatic interest of the Germans.

I wish to draw Your Excellency's attention to the appearance of the color-spectrums which could also be exploited in the field of applied art, inasmuch as according to the personal observations of Wach, the Berlin painter, the shady parts in colored drapery yield a clear dark color only when they obtain a light covering of contrasting hue, when the objective produced by the subjective which has been created by the illuminative parts are eliminated.

I am also sending you a specimen of my researches in the development of the bird's egg before laying.

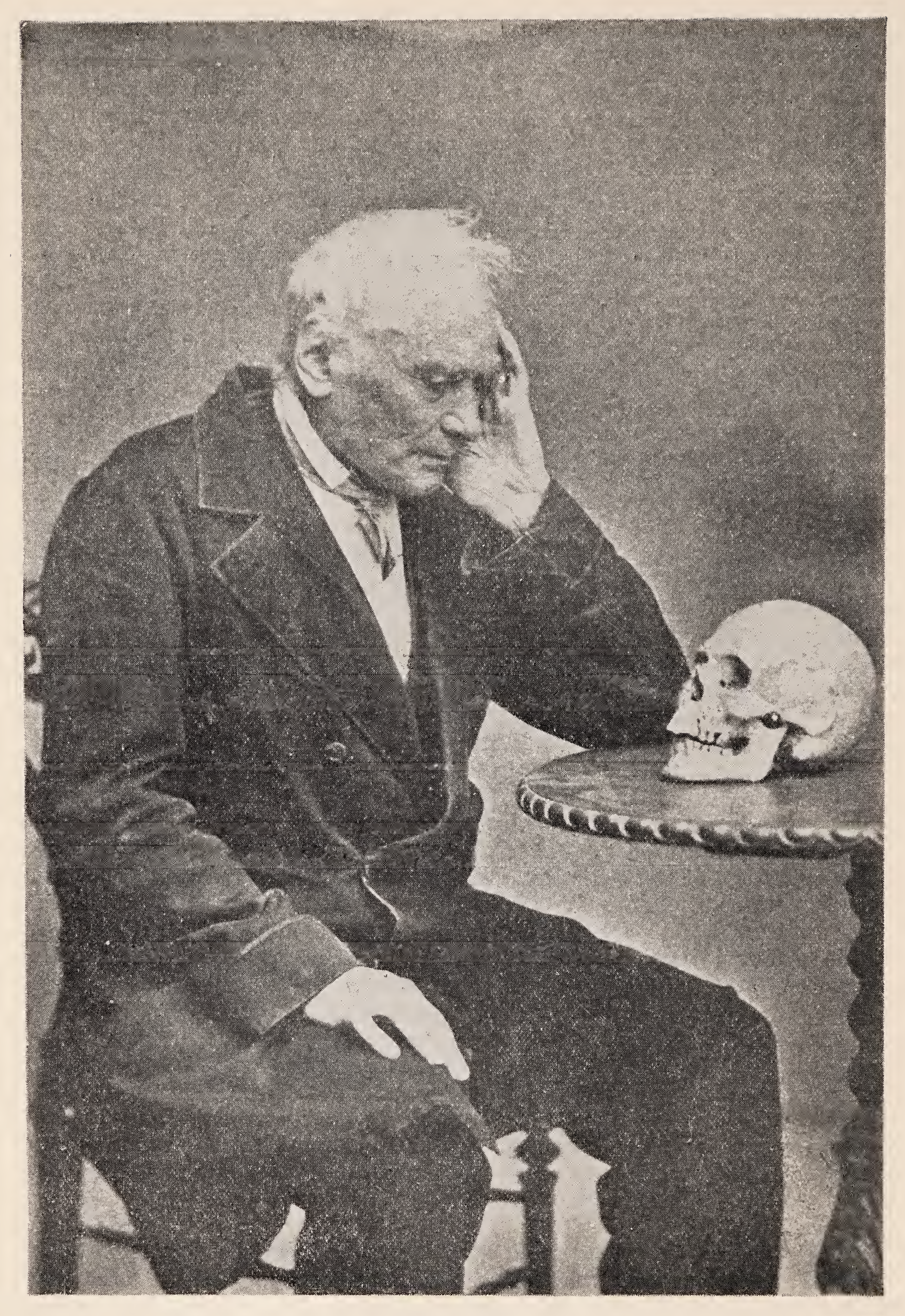
May you enjoy, with God's help, yet for a long time, your life so precious to us all.

J. Ev. Purkinje

While serving as house-tutor in Blatná in the family of Baron Hildeprandt, Purkinje had met the Baroness Adelaide Desfours. In those days literature was potent to move men and women, and after reading Schultze's poem, "Enchanted Rose," Adelaide confessed that "she felt in her heart the magic spell and her life blossomed out into full bloom." She found herself overwhelmed with love for the gifted tutor, but an aristocratic lady must be discreet, and love was translated into friendship. Twenty-two of her letters, written to Purkinje after his graduation, remain as evidence of this stifled passion: in the last of her correspondence, she tells him of her mother's death, reproaches him with not having answered her former letter, and while informing him that she has rejected a proposal, advises him to marry. Purkinje remained silent, but he did not forget, and in later years published Kacer's version of "Enchanted Rose."

Before this edition appeared, Ernst Daniel August Bartels, probably the first professor of physiology in Germany, was called from Breslau back to the older university of Marburg where he had previously taught. Purkinje was among the candidates for the vacant chair, and was rejected by the professors who did not look with favor upon the unknown Slav. They did not reckon, however, with two great European powers who stood behind Purkinje, and since the combination of Goethe and Alexander von Humboldt was irresistible, Purkinje in 1823 went to Breslau in spite of the faculty. He found himself an unwelcome guest of the university, and his chair was not lined with velvet. Naturally he spoke German with a tinge of Czech accent, and the anatomist Otto sarcastically informed him that if he wished to be understood, he would better lecture in Latin. Purkinje was not eloquent in expounding theories, and when he hinted that up to the present a lecturer in physiology was "merely a mechanism by means of which the theories of the old masters were repeated again and again," his classes dwindled in indignation and the faculty circulated a petition for his removal.

Later Purkinje stirred up more trouble by asking for a microscope. The authorities could not understand why a physiologist needed a microscope, and they sighed for the good old days of Bartels. There was the famous Bartels, becoming a Geheimrat and climbing to the Berlin chair; writing many books on *Naturphilosophie,* medicine and theology; diagnosing all diseases with the most learned phrases and knowing enough to denounce such new-fangled notions as Laennec's stethoscope; and yet he never needed a microscope. If this were permitted to go on, the university would be cluttered up with apparatus and specimens, and the students would be occupied in performing experiments instead of reading van Helmont and Haller and Bartels. Evidently the arguments failed to convince Purkinje, for in an unoccupied corner of the college building he



PURKINJE
A Contemporary Photograph

opened the first physiological laboratory. Had John Hunter tried to install his museum in St. George's Hospital, he would not have aroused more opposition than Purkinje with his laboratory, which seemed to his colleagues utterly useless in medicine. Moreover, Otto, officious and esthetic, objected strongly to the stench. Purkinje solved the difficulty by transferring the laboratory to his own house, and thereafter he lived and dined and slept in the midst of physiological equipment—including the unavoidable odors. His wife was not supposed to complain, since she was the daughter of the scientist Rudolphi.

In estimating the place of Purkinje in science, it should be remembered that he antedated the great experimental physiologists whose names are so familiar to-day. When Purkinje published his thesis in 1819, Johannes Müller was just entering the University of Bonn, Claude Bernard was a child of six, Brown-Séquard and Carl Ludwig were infants, Du Bois-Reymond was celebrating his first birthday, Brücke was uttering his first cry and Helmholtz and Huxley were yet unborn.

The test of a scientist's character is his relationship to obscurer workers. Marshall Hall, in announcing the existence of a system of excito-secretory nerves, did not mention Henry Fraser Campbell, for he had never heard of the American. Dr. Campbell, insisting that he had anticipated Marshall Hall and Claude Bernard in this discovery, forwarded to the English investigator a long letter and abstracts of his publications. The great Marshall Hall, then in his last illness, could easily have been too occupied to concern himself with the claims of the Georgia physiologist, and Campbell would have been forgotten. Instead, he sent a communication to the *Lancet*, giving the young doctor such full and generous credit that Campbell was encouraged to collect his essays into a volume which he dedicated to Marshall Hall "in high admiration of his genius, and in heartfelt acknowledgment of his liberality." This idyll of physiology is rare enough, while contests over priority are frequent, wordy, often vindictive and seldom settled. Instances in which teachers appropriate the labors of their pupils with inadequate recognition are not unknown even at the present day.

In this respect, Purkinje was particularly chivalrous and free-handed: he frequently incorporated his most important researches into dissertations which were signed by his students. Of course it was Carl Ludwig who developed this habit into a fine art. When Martin Barry, notable as the first to observe the union of the spermatozoon with the ovum, worked with Purkinje and showed him his essay on fiber, Purkinje translated it for him and had it published in Müller's *Archiv*. Another pupil was Gabriel Valentin, who increased our knowledge of taste and touch, of nucleus and nucleolus, and whose "Manual of the Development of the Fetus" was the first systematic treatise on embryology—a mighty worker was Valentin in his day, ranging various fields, but his name has been almost submerged under the never-ceasing output of his successors. It was not the fate of Purkinje to leave behind him a school like Johannes Müller or Carl Ludwig, but we may say of him as Helmholtz said of Müller: "Whoever comes into contact with men of the first rank has an altered scale of value in life. Such intellectual contact is the most interesting event that life can offer."

Purkinje could have made his discoveries in a hayloft, yet academic life must have had its attractions, for he retained his chair for over a quarter of a century. His work was the most important produced in the Silesian university until the advent of Ferdinand Cohn, who after building the foundations of bacteriology at Breslau, helped Robert Koch lay the corner-stone there by his demonstration of the life-history of an-

thrax: Cohn wrote the great news to Darwin, and the old biologist replied, "I well remember saying to myself, between twenty and thirty years ago, that if ever the origin of any infectious disease could be proved, it would be the greatest triumph to science; and now I rejoice to have seen the triumph."

Gradually the personal character and exceptional attainments of Purkinje gained recognition at Breslau. Students came to his classes and laboratory, his colleagues acknowledged his services, his small salary was increased to more respectable proportions, much-desired apparatus was secured and in time the Prussian government erected for him a separate building devoted exclusively to physiology—this first Physiological Institute was opened on November 8, 1839, and forty years passed before Berlin followed Breslau. Purkinje had reached his goal, but the fire of his genius had exhausted itself, and most of his great discoveries, the mere list of which still amazes us, had already been made in his own home. He admitted that "many promising investigations await the time when I shall have regained my lost love of work," but the fallow years proved that the ardor of youth had gone. He was indeed pleased at the tribute to his labors and science, although he no longer had the strength or enthusiasm to nauseate and sicken himself with huge doses of digitalis in order to study disturbances of vision. Moreover, administrative duties and requisitions for supplies are incompatible with research. It is pleasant to be a director or a dean, but who ever heard of a dean discovering anything? Purkinje now neglected his hard-earned compound microscope to translate the lyrics of Schiller into Czech.

The following letter written by Purkinje during his latter years at Breslau exhibits his interest in his seventeenth century countryman, the great schoolmaster whose theological performances were unfortunate, but whose name will always survive in the history of education as one of the first rationalists in pedagogy. We are indebted for this letter to the courtesy of Purkinje's grandson, Dr. Cyril Purkyně, director of the Státní Gelogický Ústav Československé Republiky:

Breslau, August 29th, 1844.

My dear friend:

That I am with you in spirit, although far away for the past two years, you may judge from my effort to join you and share with your vicissitudes until death. With the assistance of Mr. P. H. Klebelsberk I have obtained Austrian citizenship for which I applied last year, and this year I have presented through this same gentleman my request for the chair of physiology at the University Praha, to Count Kolowrat. I doubt whether it would be advisable to inform Mr. Nádherný regarding this step, as he seems to shun my free thinking, although he himself has recently suggested to me to apply for transfer. My petition for citizenship has been presented upon his advice, and perhaps without need. His second suggestion was to send a petition to the Emperor, although my citizenship definitely includes my right (for which I have asked) to apply for appointments to the institutes of learning in Austria. I presented myself to Türkheim and later upon the advice of K. to Kolowrat. We shall see what the result will be. From the enclosed letter of the Rev. Sidewice, Lěsno, Prussia, you will note that I have reopened negotiations for the purchase of the manuscript of Comenius and that they now seem to be more approachable, perhaps because of the fact that the Gymnasium Director, Mr. Scholer, who was the one who chiefly insisted to retain and exhibit the manuscript together with the relic and portrait of Comenius in the gymnasium library, has now been transferred to Erfurt. I do not see from your letter that Čelakovský could have given you any information about it, as you certainly would not have been silent on the subject and thus frustrated my many years' effort.

I would have replied to your letter earlier, but I did not want to come to you empty-handed and so I copied for you from Comenius' own manuscript, rewritten and reedited church songs, introduction, which might be published in the Musejnik as an example of writing of that time.

Should the Museum Committee definitely not wish these manuscripts, please have them send

me a few lines in German for my verification. You will kindly return to me Sidewice's letter.

I look forward to an early response from you and with my respectful greetings to your wife and kisses to your children, I am,

Your devoted

JAN PURKYNĚ

As previously stated, Purkinje's first work was in physiological optics. Thrice he wrote his name in this field: Purkinje's figures, Purkinje's images and Purkinje's phenomenon. A bibliography of the contributions to these subjects during a century would show how a large number of investigators received their impulse from Purkinje. The work of Purkinje was germinative, for even if it consisted of only a few paragraphs, it proved reproductive. His method of lighting the retina, his measurements of the curvatures of the lens and cornea, his studies of the refracting surfaces of the eye with mirrors not only anticipated the ophthalmoscope of Helmholtz, but even made it inevitable.

The name of Francis Galton is usually associated with the foundation of fingerprint identification, but seventy years earlier, Purkinje wrote: "The wonderful arrangement and design which are on the palm of the hand and upon the sole of the foot, and especially the little hollows on the fingertips, the papillary lines, command our attention." He then proceeded to describe with accuracy the unchanging character of fingerprints, illustrated with various figurations. His pioneer work is of value to all criminologists, and the English penitentiary inspector, Major Arthur Griffiths, author of the "Chronicles of Newgate," writes: "The permanent character of the finger-print was first put forward scientifically in 1823 by J. E. Purkinje, an eminent professor of physiology, who read a paper before the University of Breslau, adducing nine standard types of impressions and advocating a system of classification which attracted no great attention." With G. Rosche, we may call Purkinje the old master of dactyloscopy.

Most pre-Virchovian workers, including Purkinje, are rather roughly handled in the "Cellular Pathology," but Virchow credits Purkinje with having devised the term *corpora amylacea;* he also introduced the terms *enchyma, cambium, protoplasm* and others—almost reminding us of Walther Flemming who in a single year increased the nomenclature of cytology with *mitosis, amitosis, karyomitosis, dyaster, karenchyma, net-knot, spireme, mitome, karyoplasm* and *interfilar substance.* Richard Mead, relying on the experiments of Galen, felt safe in swallowing the poison of vipers, but Purkinje broke new ground in some of his self-experiments with belladonna, camphor, digitalis, opium, stramonium and turpentine.

Every investigator of the first rank has conducted a host of minor researches, and among Purkinje's innumerable ones may be mentioned: an early paper "On the World of Dreams," now over a century old, which should be read to-day in the light of Freudism; the contribution to acoustics, "On Tartini's Tones"; his auscultation experiment, by which he was able to determine the points of rest and motion of a vibrating plate, without employing Chladni's sand; his work on rhizopods, the nautilus, and embryology of the tadpole; his original description of the peculiar formation of the skin of cucumber plants, and his observations of the methods of fertilization in the plant world.

More important investigations, and belonging chiefly, but not exclusively, to his first sixteen years at Breslau, were his contribution to photometry; his observation that deaf-mutes can hear through the bones of the skull; his experiments upon the production of vertigo which paved the way for the knowledge of nystagmus; his work with Pappenheim on artificial digestion which antedates Schwann, including the demonstra-

tion of the dissolving power of acidulated infusion of pancreatic juice; his researches with Valentin on ciliary epithelial movement and the explanation of its independence of the nervous system; his original description of bone, cartilage, blood-vessels, gastric glands and special organs; his discovery of the sudoriferous glands and their ducts; of the flask-shaped Purkinjean nerve-cells with their axones and branching dendrites which form the characteristic features of the cerebellum, and of the Purkinje fibers in the cardiac muscle. In microscopy he was the first to use the microtome, microphotography, Drummond lime light, glacial acetic acid, potassium bichromate and Canada balsam.

There is much confusion in regard to discoveries of the nucleus: standard general and medical dictionaries give incorrect information, and Locy, although he devotes much space to it, in no way clarifies the subject. We have frequently read the statement that Purkinje in 1825 discovered the nucleus of the human ovum; this is manifestly impossible when we remember that the mammalian ovum itself was not discovered until two years later by von Baer. What Purkinje did discover was the nucleus or germinal vesicle in birds, announcing his find in the *Gratulationschrift* to Blumenbach; he was likewise the first to use the term *protoplasm* for the embryonic formative substance. Misstatements concerning Purkinje are prevalent: for example, Littré, in his classic Dictionnaire de Medecine, actually refers to him as *anatomiste hongrosis;* while Dorland, after thirteen editions of his popular dictionary, repeats this error, and gives the date of his death as 1850! A man whose connection with the cell doctrine was as intimate as Purkinje's deserves more accuracy on the part of lexicographers. If Schleiden and Schwann are the fathers of the cell-theory, Purkinje is at least its great uncle, for prior to Schleiden and Schwann he taught that organs consist of cells and nuclei, and suggested the probable identity in the structure of animal and plant cells. In this, however, he was not without various forerunners.

Since the universal cell is now recognized as the basis of life, we should be familiar with a chronology of cytology; and many of the earlier dates and facts will be found in that storehouse of biological knowledge, Johannes Müller's book. It is a pity that this great manual of physiology should have been superseded by later productions, for in numerous respects it has never been equaled. Even to-day, with a little editing and some foot-notes, it would serve admirably, for as far as we recall, the only passage that is entirely obsolete is the following: "Woman is distinguished by her modesty, meekness, patience and amiability; by her readiness to sacrifice her own good and herself for the sake of others; by her tenderness, sympathizing disposition, and piety. The field of her activity is her home and family."

If it be asked why Purkinje spent twenty-six years in a foreign country, the answer is simple: for the same reason that Kaspar Wolff, the founder of modern embryology, journeyed from his native Berlin to spend his last thirty years in Russia. Purkinje had applied for a chair in Prague, but they were filled with long-lived occupants, or the authorities appointed what Huxley would call a "safe nobody." Wolff may have grown accustomed to Catherine the Great, but in spite of his success at Breslau, Purkinje felt an expatriate, and cast many longing glances toward his own soil—more than once he sought an opportunity for returning, but Bohemia was not yet ready for her greatest son. Purkinje was a true Czech, and Tyl's "Kde domov muj" stirred him as if he were a gymnasium

student. Fortunately for his reputation, he was not guilty of the extravagances of the great Swedish anatomist, Olof Rudbeck, who, ignoring his real discoveries, regarded the ''Atlantican'' as his chief work—huge folios claiming that after Noah's flood, the land which Japheth sought and found was Sweden, the Almighty's favorite spot on earth. How men of intelligence can do these things is really beyond comprehension.

Purkinje finally returned to Prague as professor of physiology. ''Well do we remember,'' says a Czech writer, ''how Purkyně's coming in 1850 was celebrated not only in Prague, but in all the provinces.'' Old and famous, he was no longer compelled to fight for a laboratory: the Austrian government gave him a splendid one, with a capable assistant and an adequate salary. Purkinje was over sixty, and he proved that apparatus alone can not make discoveries.

It would be entirely erroneous, however, to believe that he had retired, or that his intellectual activity was at an end. The days of his epochal discoveries were indeed over, but he had made enough for an entire institute of research. He now busied himself with Czech politics, and whoever did that in the mid-nineteenth century was much occupied—he was elected to the senate and served with exemplary diligence. The pen is often the staff of age, and Purkinje wrote copiously; he was a founder and editor of the journal of natural history, *Ziva,* and for several years one of its principal contributors. He vitalized the *Journal* of the Bohemian Museum, and his popular essays in the Bohemian language stimulated interest in nature. He continued to develop the ideas of Pestalozzi, and discussed the establishment of orphan asylums from a scientific standpoint. Josef Klika was able to produce a lengthy monograph devoted exclusively to ''Purkinje as a Pedagogue.''

There are few scientific workers of the scope of Purkinje of whom as little is generally known. His name does not once occur in Baas, although that thick and valuable volume is at times overloaded with forgotten names. If an explanation is sought of this and similar omissions elsewhere, it is found partially in the fact that Purkinje, by returning to Prague and not identifying himself with the Vienna school, stood apart from the main stream of German medicine—indirect but potent testimony of the influence of the Vienna school. Distinguished medical travelers, such as Richard Bright and those who followed in his footsteps, have left their impressions of medical Vienna, but Prague was out of the way.

It would not be correct, however, to cite Purkinje as an example of genius overlooked by his contemporaries and neglected by posterity. Even when he ceased to keep up with the progress of physiology, and younger giants overstepped his own frontiers, he was not disregarded. In fact, to read nice things about himself he was not obliged to follow the usual custom and wait for the obituary notices. In 1859, the distinguished Eiselet published an accurate analysis of Purkinje's work, occupying twenty printed pages; in 1867, an appreciative biographical sketch appeared in *Svetòzor,* concluding with the passage:

> . . . the greatest reward and one which is dearest to him is the unbounded affection with which our entire nation clings to him, the proof of which was apparent last summer when he passed through some parts of the land. Wherever he appeared citizens endeavored to honor him; the day of his coming was a day of celebration. He is truly not only honor-deserving, but a really lovable personage. Whoever sees him must love him. He has lived eighty years, and certainly not in leisure, but he still walks with vigor and enjoys splendid health; it seems as though nature herself wishes to mark her ardent admirer and worker.
>
> His faculties are excellent, and he who would count upon his ''aged memory,'' would be much surprised. His humor retains its original fresh-

ness; he likes to be in company and contributes to conversation his characteristic wit. He has never known idleness and despises it now: he must be active, always, either in his own branch, or he finds other work and pursues it with youthful enthusiasm. Only recently he translated the "Evangelium" of Sallet, and Barthriari's "Book of Love"; he edited the original Austria Polyglotta, and learned the difficult Magyar tongue: he practices his violin, etc.

We can not do better in taking leave of this noble and beloved son of our nation than to call heartily *Mnogaja leta!* [many years].

In 1868, the Bohemian Medical Society at Prague published a quarto—*Quod bonum, felix, faustum fortunatumque sit, Joanni Ev. Purkyně, diem semisaecularem X. dec. 1868 summorum in medicina honorum in alma antiquissimaque universitate Pragena celebranti gratulatur. . . .* The obituary notice in the *Proceedings* of the Royal Society of London, after summing up his unusual achievements, states:

In 1848 he attended the meeting of the Slavonic races in Prague, and was present at the celebration of the five hundredth anniversary of the foundation of the university, when the degree of doctor of philosophy was conferred upon him. A long-cherished wish to be enabled to pass the remainder of his days in his native country was gratified. . . . His election as a foreign member of the Royal Society took place in 1850. He was corresponding member of the French Institute, member of the academies of Vienna, Berlin and St. Petersburg and of many other learned societies. He retained his vigor of body and mind up to the last days of his life. His death, after an illness of no long duration, on the 28th day of July, 1869, was mourned by every class of society in Bohemia.

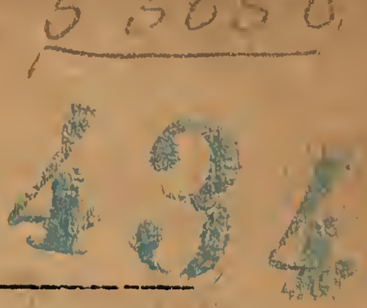
When we think of that trinity of astronomers, Horrocks, Gascoigne, Crabtree: Jeremiah Horrocks, discovering the transit of Venus across the sun, and in terror that his Sabbath duties as a parish curate would prevent him from observing this phenomenon, practically a beggar, without leisure for science, in broken health, dead at the beginning of his twenties, and from his grave teaching a Newton; his friend, William Gascoigne, inventor of the micrometer, slain in his youth at Marston Moor, leaving his work unfinished; his other friend, William Crabtree, corrector of the Rudolphine Tables, likewise disappearing early from the banquet of life in an unknown manner—we are thankful that Purkinje, like Goethe and Humboldt, was spared by fate to write *Finis* to his labors. At the time of his death, Purkinje was in his eighty-second year. Happy is the pioneer who becomes a patriarch, and at whose bier a grateful and sorrowing nation bows its head.

Now that Purkinje's beloved Bohemia has emerged as an independent country, the Republic of Czechoslovakia is adding new laurels to the name of Purkinje. Kamil Lhoták v. Lhota, professor of pharmacology at Prague, edited a handsome volume of Purkinje's original monographs. Paul J. Hanzlik, of Stanford University, informs us of the sad fact that Dr. Lhoták died young of gastric carcinoma, but no doubt other devoted hands will carry on the work. Professor Hanzlik has also directed our attention to two volumes recently issued by the Czech Medical Society of the personal correspondence of Purkinje, containing letters sent to him from a considerable number of people in all walks of life and from all over Europe—the nobility, statesmen, publicists, poets and scientists.

Foreign countries have also not forgotten him. E. Thomsen, of the University of Copenhagen, published in the *Skandinavisches Archiv für Physiologie* a study of Purkinje for which he received a gold medal. In a personal letter to Henry Jerry John, of the Cleveland Clinic, Dr. Thomsen writes: "There does not exist any reprint of my article on Purkinje. That work was written when I was a poor student, unable to buy reprints!"—here, then, is an important function for the photostat. Dr. John is the chief Purkinje student in

this country, and after several years of effort has collected, in many volumes, practically everything that has been written by and about his illustrious countryman. We can not permit this occasion to pass without acknowledging our indebtedness to Dr. John for placing at our disposal his patiently accumulated data and the illustrations which adorn his essay; when we add that Dr. John himself is planning a biography of Purkinje, yet readily granted prior use of his material, his generosity will be realized. A definitive biography of Purkinje, sixty years after his death, is much desired, for his influence lives: the *Quarterly Cumulative Index Medicus* for 1928 seems to contain more references to Purkinje and his work than to any other physiologist of his era. It is the glory of Purkinje that he holds a foremost place among the investigators who found physiology a speculative subject and left it an experimental science.

Hradčany Hill with its castles and cathedrals has seen a thousand years of battle, and for centuries the waters of Vltava have been reddened by intolerance. Towers upon towers, and those black Towers of the Abandoned. This is the story of Prague, and it is also the story of every capital in Europe. Climbing the Petrin, looking over Prague to the Giant Mountains, and from the heights of Moravia's frontier to the Bohemian Forest, how magnificent would be the view if we did not know that every inch of soil was bloodstained. Prague is beautiful—Humboldt calls it the most beautiful inland town of Europe—and to enter this historic threshold would be a feast for the soul, could we but forget the aggressions of kings and the endless strife of conflicting sects in the name of the Prince of Peace. . . . That wonderful old clock with the moving apostles and the crowing cock is still ticking the time—the clock that told the hours before Columbus set sail for America and immortality. Those countless moss-grown tombs in the ancient and crowded burial-ground of the Jews—under the elder-trees, the teacher tenderly surrounded by his thirty-three scholars. To Prague in his broken years came that master of the moon, Tycho Brahe, and here are his remains and relics; after him followed a pock-marked vagabond from a public-house to capture a planet for a mad emperor—John Kepler's "Commentaries on Mars" helped fulfil the prophecy of Libussa: "I see a city whose glory touches the stars." Monuments of monarchs and warriors—several recently removed from the public squares and hidden in museums. Let these medieval spirits disappear forever, until there glows across humanity's sky the sunrise that shall never set, burning away the barriers that divide the human race, revealing at last to the children of Mother Earth that none can be aliens and all are brothers. . . . Wandering through the streets of Prague, in the aimless yet interested fashion of tourists, we came suddenly upon a simple house with a plain tablet stating that this was the house of Purkinje. To the student of science this is the most inspiring spot in all Prague, for here lived the man who standing humbly before truth, read many of nature's secrets, and thus enlarged the human horizon.



FACULTÉ DE MÉDECINE DE PARIS

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POUR

LE DOCTORAT EN MÉDECINE

Présentée et soutenue le mercredi 12 juillet 1905, à 1 heure

PAR

Philippe ROCHE

LES PRÉCURSEURS DE PASTEUR

HISTOIRE DES FERMENTATIONS

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Le Candidat répondra aux questions qui lui seront faites sur les diverses parties de l'enseignement médical

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Par délibération en date du 8 décembre 1798, l'Ecole a arrêté que les opinions émises dans les dissertations qui lui seront présentées doivent être considérées comme propres à leurs auteurs et qu'elle n'entend leur donner aucune approbation ni improbation.

A CEUX qui, par leurs soins et leurs sacrifices, nous ont permis de mener à bien les études que nous avons faites, je dédie ce travail, trop faible témoignage de profonde reconnaissance.

A TOUS NOS MAITRES, à tous ceux qui, par leurs leçons, leur pratique et leur exemple, ont fait notre éducation scientifique, à tous nous voudrions exprimer les sentiments de reconnaissance et d'estime que leur bienveillance a suscités en nous : à M. le professeur G.-H. ROGER, à M. ALBERT ROBIN, membre de l'Académie de Médecine, à MM. les professeurs agrégés CH. ACHARD et J. THIROLOIX, à M. le docteur L. GUINON, médecins des hôpitaux ; à M. le professeur agrégé F. LEGUEU, chirurgien des hôpitaux, à M. le docteur BOISSARD, accoucheur des hôpitaux, à mon maître et ami le D[r] QUIDET, ancien préparateur de pharmacologie à la Faculté.

JE REMERCIE TOUT PARTICULIÈREMENT

MONSIEUR LE PROFESSEUR DÉJERINE
Professeur d'Histoire de la Médecine,
Médecin de la Salpétrière,
Officier de la Légion d'honneur,

d'avoir bien voulu accepter la présidence de cette thèse. L'honneur qu'il nous a fait est pour nous la meilleure récompense à notre effort.

AVANT-PROPOS

Nous n'avons songé, en écrivant ce travail, qu'à une chose : remettre au point une des époques les plus importantes de l'histoire de la médecine.

L'HISTOIRE n'est pas seulement le récit des faits ; elle doit être surtout l'explication de leur enchaînement.

Or, si l'œuvre pasteurienne n'est ignorée de personne, elle est par contre mal connue de la plupart.

Je prierai donc le lecteur, s'il s'en présente, de ne pas voir dans ce court travail une œuvre de polémique qui serait aussi déplacée qu'inutile. Si, dans le courant de ces quelques pages, il rencontre par hasard quelque idée qui le choque, je le prie de ne pas s'effaroucher ; et si, parvenu au terme de ce travail, nous n'avons pas, faute de talent, réussi à le convaincre, qu'il interroge lui-même l'Histoire ! il verra qu'elle est remplie de procès à reviser. Et peut être alors, faisant table rase de la légende, s'enthousiasmera-t-il pour cette Vérité historique que notre éminent maître, le professeur G.-H. ROGER nous a appris à aimer et qui constitue le principal sujet de cette thèse.

INTRODUCTION

Nous savons tous qu'une grande découverte n'est jamais l'œuvre d'un seul jour, ni d'un seul homme.

Et pourtant, chose curieuse, nous avons en France une tendance marquée à accepter sans contrôle une réputation toute faite, et cela, d'ailleurs, avec le même enthousiasme que nous mettons à rejeter sans examen tout ce qui semble de nature à ébranler les idées en cours. On n'aime pas à remonter aux origines quelquefois lointaines d'une découverte, et on donne à celle-ci le nom du dernier, du principal auteur.

On oublie que l'invention suppose des voies tracées ; on oublie que bien des essais ont été tentés : la plupart ont pu sans doute rester infructueux ; qu'importe, s'ils ont apporté un rayon de lumière dans l'ensemble confus des phénomènes à expliquer.

Un édifice qui, par son allure, étonne l'œil du spectateur, a nécessité des fouilles et des fondations qui, pour être cachées, n'en ont pas moins exigé de laborieux efforts. Eh bien ! il en est de même dans le domaine scientifique. Rendu plus sage et plus expérimenté par les

tentatives et les insuccès même de ses devanciers, rassemblant tous les matériaux déjà trouvés, le savant, guidé par son génie, établit l'harmonie là où régnait la confusion, et l'invention voit le jour.

C'est peut-être par ignorance de ces principes que l'on a comblé Pasteur d'une gloire sans attaches ; on en a fait un véritable Dieu-Génie, un Dieu révélateur qui a fait connaître au monde ignorant, l'explication de phénomènes encore mystérieux ; si bien que, pour beaucoup, c'est Pasteur qui, le premier, a compris ce que c'est que la fermentation par exemple ; avant lui on ne voyait dans ce phénomène qu'une transformation plus ou moins vague et indéterminée dans sa cause et dans ses origines. Sur la génération spontanée, les idées qui avaient cours n'étaient qu'idées d'enfant. Pasteur vint heureusement tirer la science du chaos où elle gisait. Quant à la pathologie des microbes, elle n'était encore, si on en croit Duclaux, qu'une *Terre promise* où nul pied avant lui n'avait su s'orienter. On avait bien, avant lui, découvert des bacilles tels que la bactéridie charbonneuse ; mais les notions en étaient encore confuses, et seul, Pasteur, au dire de ses disciples, devait apporter la lumière dans ces ténèbres. Si bien qu'aujourd'hui, pour des esprits trop crédules, fermentations, génération spontanée et microbes, tout cela se confond en un même symbole : tout cela, c'est Pasteur.

Ces exagérations constituent au fond une injustice regrettable pour tous ceux (et ils sont nombreux) qui, ne s'appelant pas Pasteur, ont néanmoins, par leurs tra-

vaux, préparé la route au grand savant, ou même ont avancé à côté de lui.

Certains esprits, et non des moins érudits, s'étant avisés de passer au crible une grande réputation qui leur arrivait toute faite, s'aperçurent que dans ce bloc intangible et sacré qui constitue l'œuvre de Pasteur, il y a des parties qui ne sont pas sa propriété exclusive, et accusèrent non pas l'ignorance des admirateurs, mais leur mauvaise foi. Au lieu du savant auquel on rapportait tout, on a accusé Pasteur de n'avoir rien inventé du tout ; on lui a reproché d'avoir beaucoup emprunté aux autres et montré une fâcheuse tendance à se prévaloir de sa position pour refuser à ceux qui servent la science gratuitement, les égards auxquels ils ont droit. Pasteur aurait ainsi établi une véritable conspiration du silence sur les travaux de ses adversaires, et beaucoup de ses inventions ne seraient plus que de fausses découvertes sur lesquelles il est temps de faire la lumière.

Nous nous garderons de tomber dans ces exagérations. Mais on conviendra qu'il était malaisé à des esprits enthousiastes de vérité de rester dans une juste mesure, et de ne pas tomber d'un excès dans un autre. Horace, déjà, n'excusait-il pas ce défaut qu'il avait reconnu inhérent à l'esprit humain ? L'homme qui n'est pas parfait n'a pas changé depuis l'époque latine, et si nous nous sommes arrêtés à signaler les critiques acerbes de ceux qui ont perdu la foi en Pasteur, c'était uniquement pour montrer le revirement qui s'opère dans cette sublime épopée.

Il résulte de tout ceci qu'il y a là une grave question

à résoudre. La tâche est d'autant plus délicate qu'on se heurte à une idée qui a acquis droit de cité, et qu'en France tout ce qui est tradition est *à priori* inattaquable.

Pour nous et pour tous ceux qui ont étudié de près la question, il est de toute évidence qu'on a beaucoup trop idéalisé l'œuvre de Pasteur ; sans nier catégoriquement l'influence des devanciers du maître, on l'a en somme réduite à néant, et l'on s'est plu à représenter ses découvertes comme les actes d'un génie révélateur qui a semé le miracle partout où il s'est arrêté. Si vous n'êtes pas convaincus, écoutez plutôt Duclaux ; ses paroles sont intéressantes parce qu'elles donnent, mieux que tout commentaire, une idée de cet hyperbolisme dans l'éloge qui amuse peut-être autant qu'il étonne :

« *L'esprit de Pasteur, c'est l'oiseau qui vole; on ne le voit que lorsqu'il se pose ou qu'il prend son essor... Pourquoi s'est-il abattu ici et non là ? Pourquoi a-t-il pris cette direction et non cette autre, pour s'envoler vers de nouvelles découvertes ? Si vous pouviez le savoir et nous le dire, Pasteur ne serait plus un génie échappant à l'analyse... Pasteur n'est pas un savant comme les autres ; sa vie scientifique a une admirable unité ; elle a été le développement logique et harmonieux d'une même pensée. Sans doute, il ne savait pas, quand il faisait ses premières études de cristallographie, qu'il aboutirait un jour à la prévention de la rage. Mais Christophe Colomb ne savait pas non plus, en partant, qu'il découvrirait l'Amérique. Il devinait qu'en allant toujours dans la même direction, il décou-*

vrirait quelque chose de nouveau. Ainsi a fait Pasteur. Dès ses premiers travaux il a eu devant lui un problème de vie ; il a trouvé la route pour l'aborder, et depuis il a toujours marché dans la même voie, consultant la même boussole. Sans doute, il a traversé des pays bien divers où il a laissé sa trace. Mais il ne les cherchait pas, ils étaient sur son chemin ; et la grandeur de ses découvertes fait que l'histoire de son esprit, même réduite à un procès-verbal, peut revêtir les allures d'un roman d'aventures qui serait vrai. »

Tout cela est fort bien, et à la vérité il faut reconnaître que cette façon de représenter Pasteur comme un grand aventurier de génie, allant de ci de là extraire des ténèbres de la science les merveilles qui y demeuraient ensevelies, que cette façon d'éloge, dis-je, était bien faite pour rallier tous les esprits au drapeau d'un même culte. Le malheur, et c'est là ce que nous voulons démontrer, c'est que les aventures qu'il allait traverser lui étaient connues par avance, et que les pays nouveaux qu'il allait parcourir, se présentaient à lui avec des voies toutes tracées. Cela, du reste, ne supprime pas le mérite du savant ; mais cela diminue singulièrement la gloire du novateur.

Quand il lui est arrivé de se frayer lui-même une route, il s'est parfois trompé, et ses erreurs ont été de longue haleine ; les fanatiques de sa gloire le reconnaissent, mais ils s'empressent, il est vrai, de proclamer *qu'il a été constamment ramené dans le vrai chemin par cette sévère méthode expérimentale dont il a si souvent parlé avec reconnaissance.* Or, l'histoire nous

apprend que les travaux parallèles de ses contemporains ont contribué autant, sinon plus, que la sévère méthode expérimentale à ramener l'égaré en bonne voie.

Ceux-là même qui ont entrepris son panégyrique auraient pu, tout au moins, le reconnaître et rendre aux savants oubliés l'hommage qui leur est dû.

Voilà qui peut étonner au premier abord, mais qui, au fond, n'a rien que d'habituel. Il s'est passé pour Pasteur ce qui se passe pour bien d'autres.

Nous savons, en effet, qu'une grande découverte scientifique est souvent méconnue et bafouée quand elle paraît, et que, par suite, elle ne tarde pas à devenir lettre morte jusqu'au jour où un savant, dont la notoriété est acceptée de tous, la tire de l'oubli et la dispute à son véritable auteur,

Combien de savants trop modestes pourraient ainsi formuler leurs revendications ! Combien de réputations surfaites ont leur source dans les travaux de chercheurs méconnus. Ce sont là des désillusions terribles, qui guettent souvent les serviteurs de la science ; et on comprend, qu'aigris par les déceptions, ils désertent les régions ingrates de la science pour aller chercher vers des horizons plus hospitaliers les satisfactions intimes que l'esprit de cabale leur a ravies. Heureux, les savants qui savent peiner à l'ombre des grandes renommées et à l'abri des éclats dissonnants de la gloire ! Ceux-là savent peut-être que les aspirations les plus pures ne sont souvent qu'un voile pour les plus vils intérêts ; et c'est sans doute dans cette connaissance de la réalité qu'ils puisent l'énergie nécessaire à la poursuite de leur idéal ; car ils sa-

vent, sans doute, aussi que ce qui importe dans le sacrifice, c'est le sacrifice même et que si l'objet pour lequel ils se dévouent est une illusion, le dévouement n'en est pas moins une réalité, « *la plus splendide parure dont l'homme puisse décorer sa misère morale.* »

Quoiqu'il en soit, nous nous proposons, dans ce travail, de déterminer ce qu'a été réellement l'œuvre de Pasteur. Recherchant avec soin ce qu'on avait fait avant lui, nous saurons ainsi ce qu'il lui restait à faire, et nous pourrons apprécier plus sainement le rôle qu'il a joué comme savant et comme novateur.

Nous ne nous dissimulons pas que les opinions exprimées dans les lignes qu'on va lire, cadrent mal avec celles qui sont aujourd'hui généralement acceptées, et risquent fort, au prime abord, de troubler, par leur brutalité même, certains esprits adeptes inconscients de traditions consacrées. Quel que soit le jugement qu'on nous réserve, nous réclamons, à défaut d'autre mérite, celui d'avoir été guidé dans ce travail par la meilleure foi du monde et le souci le plus absolu de la vérité.

Notre première intention était d'aborder, les unes après les autres, les différentes questions que Pasteur a traitées et qui constituent comme autant de traits de gloire à son honneur. Notre tâche devait être longue et laborieuse ; mais elle ne pouvait qu'à ce prix nous permettre de juger raisonnablement l'influence que les précurseurs de Pasteur ont exercée sur la direction de ses travaux.

Malheureusement la critique de l'œuvre complète de Pasteur nous eût entraîné dans des développements

disproportionnés avec le cadre modeste d'un travail de fin d'études. Et puis il y a dans les travaux de Pasteur certaines parties telles que les découvertes sur la rage et le charbon, dont il serait pourtant bien intéressant de refaire une histoire plus vraie ; mais un tel sujet réclamerait une voix plus autorisée et une compétence que nous n'avons pas.

« L'œuvre médicale de Pasteur, écrit M. Roux (1), commence avec l'étude des fermentations. »

C'est donc par l'étude historique des fermentations que nous devons commencer.

(1) Roux, in préface de l'*Agenda du Chimiste pour 1896*.

LES FERMENTATIONS

« *La question des fermentations*, écrit Duclaux (1) *était, au moment où Pasteur l'a abordée, un ensemble si confus, que, non seulement on a peine à se représenter ce que pensaient du phénomène les chimistes de l'époque, mais qu'on doute même qu'ils aient eu à ce sujet une idée nette, tant on trouve de contradictions et de singularités dans leurs écrits.* » Voilà qui est clair. Maintenant, si cette ignorance pré-pasteurienne venait par hasard à vous étonner, écoutez l'explication qu'en fournit le même auteur : « *Quand on cherche*, ajoute-t-il, *d'où vient cet état larvaire des conceptions sur la fermentation jusqu'au milieu du* XIXe *siècle, on s'aperçoit qu'il est dû non aux difficultés du sujet, mais à ce que la question a été philosophique avant de devenir scientifique.* »

Ainsi, voilà, en quelques mots, jugés et en même temps condamnés, tous les travaux de ceux qui ont étudié les fermentations avant Pasteur, ou en même temps que lui. Qu'y a-t-il de vrai dans cette assertion ?

(1) Duclaux. *Loc. cit.*

La science des fermentations était-elle si obscure quand Pasteur l'a abordée? c'est là, croyons-nous, une affirmation toute gratuite ; nous en verrons l'inexactitude. Quant aux contradictions et aux singularités relevées par l'élève de Pasteur, on en trouve bien certainement quand on étudie l'histoire des fermentations ; on constate même parfois des extravagances. Mais ces contradictions, ces singularités ont eu chacune leur intérêt dans la question : elles ont marqué chacune une étape dans la solution du problème. N'est-ce pas, en effet, après bien des hésitations et bien des chutes que l'enfant parvient à marcher droit? — Et puis, si on venait dire par exemple à Buffon ressuscité que la fermentation est due à la multiplication d'un germe de l'air, nul doute que ce même Buffon dont la doctrine offre un exemple remarquable de ces singularités dont parle Duclaux, ne puisse à son tour nous embarrasser singulièrement en demandant : « *Mais d'où vient ce germe que vous invoquez pour expliquer les phénomènes?* »

Il nous faut donc, au contraire, considérer comme très précieuses les moindres tentatives que nous offre l'histoire des fermentations, et il nous semble que leur refuser arbitrairement tout caractère scientifique en les qualifiant dédaigneusement de *philosophiques*, c'est faire preuve d'une partialité bien peu de mise chez un savant.

Les phénomènes de fermentation sont aussi anciens que le monde, ou du moins contemporains des premiers besoins de l'homme : « *Tous les historiens s'accordent à dire que les plus anciens peuples savaient préparer*

les boissons spiritueuses. La découverte de la fermentation vineuse remonte donc aux temps les plus reculés, et même, si nous en croyons les poètes, nous la placerons dans les temps fabuleux. Il serait étonnant, en effet, qu'elle eût échappé aux regards des premiers hommes. Une ébullition naissant spontanément au sein d'un liquide, une masse tout entière se soulevant d'elle-même, une liqueur douce devenant vineuse, le changement d'une matière sucrée en esprit ardent : tout ceci est extraordinaire, tout est fait pour frapper l'attention, et pour éveiller le désir de remonter aux causes premières. Aussi n'est-il point de phénomène plus anciennement observé (1). » Cet espèce de bouillonnement qui se produit spontanément dans le jus écrasé du raisin, cette production continue de petites bulles gazeuses qui viennent crever à la surface avaient en effet tellement frappé l'esprit des premiers hommes que ceux-ci l'avaient comparée à l'état d'un liquide placé sur le feu. Il est curieux de voir cette analogie entre l'ébullition et la fermentation alcoolique se traduire dans les langues les plus anciennes : le nom hébreux du vin *(yine)* vient d'un verbe qui signifie faire effervescence, se soulever, bouillir, et il doit avoir des racines profondes dans les âges car il a donné le nom du vin à tous les peuples de l'Occident. Le mot fermentation, plus récent, vient de *fervere*, bouillir. Le nom allemand de la levûre, *hefe*, vient de *heben*, *s'élever*, et les mots gallo-latins de

(1) Thénard. *In-Memoire sur la fermentation vineuse. Annales de chimie*, an XI, tome 46.

levûre et de *leaven*, expriment les mêmes relations. Le changement de goût qui se produit dans le liquide fermenté n'avait pas paru moins surprenant que la fermentation elle-même, et les noms de Noé, d'Osiris, de Bacchus, témoignent de la reconnaissance des populations pour ceux qui leur ont donné des boissons alcooliques.

La fabrication de la bière était également connue de la plus haute antiquité, chez les Egyptiens, les Espagnols et les Gaulois. Quant au pain, il est certain que sa fabrication n'a été connue que plus tardivement. La mouture, la cuisson ont dû constituer des découvertes successives, et la mise en levain n'a été connue qu'après. Abraham servit du pain sans levain aux deux anges qui lui apparurent dans la Vallée de Mambré, et ce n'est guère que du temps de Moïse qu'on voit apparaître le pain fermenté. Puis la fabrication du pain se perfectionnait peu à peu ; celui qu'on mangeait dans la Gaule jouissait de la réputation d'être léger et facile à digérer, parce qu'on le faisait lever au moyen de levure de bière au lieu de levain ou de farine aigrie.

Mais, pendant que se perfectionnait la pratique, l'étude théorique des phénomènes de la fermentation sommeillait. Même le terme de fermentation ne s'appliquait encore « *qu'au mouvement de la pâte de froment qui se lève et à celui des liqueurs qui se changent en alcool* » (1).

Cependant l'**Alchimie** naissait. « *La curiosité des*

(1) Chevreul. *In. dict. des sc. naturelles. Strasbourg*, 1820. Art. Fermentation.

alchimistes, écrit Duclaux, *ne pouvait manquer d'être éveillée par le bouillonnement qui se produit spontanément dans la masse de vendange, ou qu'on provoque dans le moût d'orge par l'addition de levure de bière, le changement de saveur et de propriétés qui résulte de l'introduction du levain dans la pâte de la farine* » (1). Mais, ajoute-t-il ailleurs, « *l'Alchimie, qui avait emprunté à l'art sacré du premier millénaire ses mots et ses problèmes, se proposait un but trop élevé pour s'occuper de phénomènes vulgaires comme la fermentation du pain et du vin* » (2).

Sans doute la curiosité des alchimistes fut éveillée par ces phénomènes encore inexpliqués auxquels les philosophes n'avaient emprunté jusqu'alors que des comparaisons et des images. Et c'est précisément un grand honneur pour eux d'avoir soustrait la chimie aux spéculations purement métaphysiques, pour la porter sur un terrain scientifique.

On leur reproche volontiers d'avoir expliqué les phénomènes de la fermentation par « *une puissance mystérieuse avec laquelle ils auraient pu tout aussi bien, croyaient-ils, transformer un métal vil en métal précieux.* » Mais cette façon d'expliquer la fermentation découlait tout naturellement de leur système et mérite, quand on y réfléchit, autre chose que le dédain facile et commode d'un historien trop pressé.

Quel était, en effet, le principe fondamental de l'Al-

(1) Duclaux. *Hist. d'un Esprit.*

(2) Dict. Dechambre. *Art. fermentation.*

chimie ? Géber, le plus fameux d'entre eux, qui a découvert l'acide nitrique, l'eau régale, la pierre infernale et le sublimé corrosif, partait de cette idée que les métaux se composent de trois éléments : le soufre, le sel et le mercure. Avec ces trois éléments chimiques, considérés comme constituants des métaux, les alchimistes furent conséquents avec eux-mêmes en admettant la possibilité de la transmutation. Du moment, en effet, que, pour les alchimistes, les métaux étaient constitués par la réunion de trois éléments, toujours les mêmes, il semblait naturel qu'en faisant varier les quotités de ces éléments, on fit passer un vil métal tel que le plomb en or ou en argent. C'était là une déduction basée sur un principe faux, puisque depuis la chimie lavoisienne, les métaux sont regardés comme des corps simples, du moins jusqu'à nouvel ordre ; c'était, en tout cas, une déduction logique ; et la transmutation ainsi envisagée n'avait rien d'absurde.

Or, la nature n'offrait-elle pas, aux yeux des alchimistes, de multiples exemples de transmutation spontanée, dans les phénomènes de fermentation ?

Sans doute. Aussi Géber s'empressa-t-il d'assimiler à un ferment cette pierre philosophale qui lui échappait toujours. « *Le ferment ou levain*, écrit-il, *est-ce qui ramène à sa nature, et couleur et saveur, les choses à quoi on le mêle. Si on met, comme levain, un mauvais corps dans un bon, le bon ne deviendra pas mauvais ; si on met un corps bon dans un mauvais, le mauvais deviendra bon* ». Ainsi, avec Géber, Avicenne et d'autres comme Rhasès, Albert-le-Grand et Glauber

nous sommes loin de ces stupéfiantes aberrations dont on fait si facilement un reproche aux alchimistes, et qui ne doivent être considérées du reste que comme d'habiles supercheries. Car, à côté des charlatans rusés il y a les alchimistes « *honnêtes, probes, courbés sur leurs fourneaux, agenouillés devant leurs matras, passant mystérieusement leur vie à la recherche du grand œuvre, trop souvent victimes eux-mêmes des explosions des cornues, des ruptures, des pélicans et des retortes, des incendies provoqués par la subite inflammation des gaz combustibles* ». Ce sont eux qui ont préparé les éléments nécessaires à la chimie ; s'ils n'ont pas mérité le titre de chefs de l'école expérimentale comme plusieurs écrivains le leur ont donné, ils ont du moins inauguré l'ère des expériences. S'ils n'ont pas résolu la question des fermentations, ils ont du moins découvert l'eau-de-vie, et recommandé plusieurs préparations pharmaceutiques dont l'excipient est l'alcool qu'ils savaient préparer. S'ils n'ont pu fournir l'explication du phénomène fermentation, du moins il ont su faire reposer l'interprétation qu'ils en donnaient sur l'examen des faits ; et on trouve dans leurs écrits des expressions qu'on peut considérer sans aucune complaisance comme *l'aurore et parfois l'énoncé de découvertes récentes.*

C'est ainsi qu'ils font allusion tantôt au dégagement du gaz (*exaltatio*) dans la fabrication du vin, tantôt à ce que le pain fermenté peut à son tour servir de levain (*immutatio*).

Au reste, à défaut des mille découvertes qu'ils ont faites, leur désintéressement leur donne droit à notre

admiration et à notre respect. « *Admirables fous sacrifiant tout : honneurs, richesses, famille, santé, existence, au triomphe de ce qu'ils croyaient être une immuable vérité, mourant de faim comme Louis de Neus dans une prison, subissant la potence comme Brazadino, Georges Honauer, ou se sentant griller dans une cage de fer comme Marie Ziglerin ; ils étaient le vivant emblême de la persévérance poussée jusqu'à ses dernières limites, et jusqu'audelà du tombeau. L'opérateur qu'une mort prématurée enlevait à ses travaux, laissait souvent une expérience commencée en héritage à son fils ; et il n'était pas rare de voir celui-ci léguer dans son testament le secret de l'expérience inachevée dont il avait hérité de son père* ». Un critique du temps dépeint avec une rigoureuse âpreté la fièvre ardente qui dévorait les alchimistes et les conduisait à une ruine certaine : il s'exprime ainsi. « *Les dommageables charbons, le soufre, la fiente, les poisons, les mines, et tout du travail leur semble plus doux que le miel, jusqu'à ce que, ayant consommé : patrimoine héritage, meubles, qui s'en allaient en cendres et fumée, ces malheureux se trouvaient chargés d'ans, vêtus de haillons, affamés, toujours, sentant le soufre, teints et souillés de suie et de charbon, et par le fréquent maniement du vif argent, devenus paralytiques* » (1). G. Naudé qui écrivit ces lignes en 1625, ne peut, j'imagine, être taxé de partialité ; et Duclaux, avant de rayer aussi

(1) G. Naudé. *Apologie pour tous les grands personnages qui ont été faussement soupçonnés de magie*, 1625.

catégoriquement les alchimistes de l'histoire de la chimie, aurait pu lire son appréciation, ou encore cette autre que Louis Figuier donnait en 1860 (1) : « *Chimistes de nos jours, ne portons pas un jugement aussi sévère sur les philosophes hermétiques ; ne nous dépouillons pas de tout respect envers leur antique héritage : insensés ou sublimes, ils sont nos véritables aïeux. Si l'alchimie n'a pas trouvé ce qu'elle cherchait, elle a trouvé ce qu'elle ne cherchait pas : la chimie, et si la chimie ne renferme pas la pierre philosophale des anciens adeptes, elle constitue, on peut le dire, la pierre philosophale des nations.* »

Paracelse (1493-1541) s'appliqua à démontrer la vanité du peu que l'on savait. Il joignait à un grand esprit, un dédain profond pour les spéculations philosophiques et pour les connaissances de tradition. Aussi regardait-il Gallien et Hippocrate comme des charlatans. Dans les leçons qu'il fit à Bâle en 1524, il expose ses idées sur les maladies « *avec la modestie d'un homme qui s'attribuait la monarchie de la médecine et à qui Dieu avait révélé le secret de prolonger la vie à son gré.* »

Pour lui les maladies ne sont que des fermentations dues à des substances excrémentitielles qui, au lieu d'être rejetées, sont retenues dans l'économie. Et dans sa pensée, il devait exister pour chacune de ces fermentations un *médicament spécifique capable d'en suspendre le développement*. On voit que l'idée était assez neuve. Mais, comme il n'appuyait sa conception sur aucune

(1) *L'alchimie et les alchimistes.*

démonstration, ses adversaires lui en voulurent beaucoup et jugèrent que « *le visionnaire n'était qu'un esprit faux, digne d'être mis en parallèle avec les effrontés qui montent sur des trétaux et qui se font un revenu de leur habit et de leur impudence* (1). »

Toujours est-il que Paracelse eut l'honneur de provoquer des études sérieuses et de faire naître l'ère des découvertes.

Après lui **Van Helmont** (1588-1644) adopte ses idées, mais les précise. Il porta si loin ses connaissances dans la physique, la médecine et l'histoire naturelle, qu'il fut soupçonné de les tirer de la magie et fut jeté en prison par l'Inquisition. C'est lui qui découvre l'acide carbonique et qui constate son dégagement dans la fermentation du vin, et dans l'action des acides sur les carbonates.

Fort de cette découverte, et sentant toute l'importance de la chimie, il crut trouver dans cette science l'explication de ce que la vie présente de plus mystérieux. Mais, comme la science sur laquelle il s'appuyait, n'était encore qu'à son berceau, il suppléa à la connaissance de ses lois par le rapprochement qu'il fit entre des phénomènes chimiques qui frappent tous les yeux et ceux qui, suivant lui, devaient se passer dans le corps de l'homme. Aussi le voyons-nous assimiler entre eux tous les phénomènes qui se manifestent par un dégagement d'acide carbonique, à savoir : la fermentation du vin, la putréfaction, la digestion, les sécrétions, etc... Pour

(1) Nouveau dictionnaire historique, Amsterdam, 1766.

lui la fermentation n'existait pas seulement dans la pâte ou dans les liqueurs sucrées, mais encore dans l'action des acides sur les alcalis carbonatés, dans l'efflorescence des mines, dans l'altération de l'eau commune, dans celle des liquides animaux et des sucs végétaux extraits des corps vivants, soit qu'ils donnassent de l'acide ou de l'alcali volatil, dans la germination, dans la maturation des fruits, dans la rancidité des corps gras, etc...

« *Il voyait donc des fermentations là où il voyait un dégagement de chaleur qui n'allait que dans les cas extrêmes jusqu'à produire du feu, comme cela arrive à certaines terres pyriteuses et au foin humide ; là où il y avait un bouillonnement produit sans la présence du feu ; enfin, là ou des corps, en agissant l'un sur l'autre, éprouvaient un grand changement dans leurs propriétés.* »

L'ensemble de ces phénomènes n'était point nécessaire pour constituer une fermentation, un seul d'entre eux suffisait et par conséquent le bouillonnement ne fut plus considéré comme un caractère essentiel de la fermentation.

Van Helmont attribuait la fermentation à un ferment qui agissait sur une matière fermentescible en la dissolvant, qui lui imprimait plusieurs de ses propriétés et qui la faisait passer par une suite d'états ou de formes jusjusqu'à ce qu'elle fût enfin assez divisée pour être réduite en eau.

Dans cette manière de voir, une matière sucrée, par exemple, devenait successivement alcoolique, acide, et enfin se résolvait en eau. Cette eau, du reste, il la consi-

dérait comme l'élément unique des plantes ; si bien que l'idée de la dissolution se trouvait comprise dans celle de la fermentation.

En même temps que Van Helmont, **Robert Boyle** (1626-1691), savant irlandais, travaillait à cette question. C'était un expérimentateur aussi habile mais plus original et surtout plus fécond. « *Doué de cet infatigable génie des détails qui est éminemment utile dans les investigations scientifiques, Boyle étendit et perfectionna l'art d'interroger la nature par l'expérience et par l'observation. Il adopta les principes de la philosophie scientifique de Descartes et de Bacon, et, guidé par leurs préceptes, il amassa un précieux tribut d'observations et de faits que ses successeurs devaient étendre et utiliser un jour* (1). » Il se passionna pour cette question des fermentations. Comme son contemporain, cette idée de corrélation entre les fermentations et les phénomènes normaux et pathologiques de l'être vivant le préoccupait vivement, et lui apparaissait tellement évidente qu'elle lui inspira quelque part les curieuses réflexions que nous reproduisons tout entières : « *Je dis de nouveau que je ne prétends pas que la chimie vulgaire peut permettre à un médecin d'expliquer tous les phénomènes pathologiques ; mais que la vraie chimie peut lui servir à comprendre quelques-uns d'entre eux que l'on ne peut guère expliquer sérieusement sans elle, et j'ajoute que celui qui comprendra entièrement la*

(1) Louis Figuier. *Vie de savants illustres du XVII*[e] *siècle* (1869).

nature des ferments et des fermentations sera probablement, bien plus que celui qui l'ignore, en mesure de rendre compte d'une manière satisfaisante de divers phénomènes présentés par plusieurs maladies (les fièvres aussi bien que les autres), phénomènes qui ne seront probablement jamais bien compris sans une connaissance intime de la doctrine des fermentations (1). »
Belle prophétie que l'avenir allait bientôt justifier !

Jean Joachim Becher (1645-1684), que sa physique souterraine avait rendu si célèbre, s'adonna passionnément à l'étude de la fermentation. « *J'ai passé, dit-il, quelques années dans la pratique des fermentations, de façon à bien tout voir, et ce n'est pas d'après Angelo Sala et d'autres compilateurs que j'écris.* »

Et de fait, il introduit une idée nouvelle : il établit nettement une distinction entre les dégagements gazeux qui se produit dans les phénomènes chimiques et celui qui a lieu dans les phénomènes biologiques : « *L'effervescencc*, dit-il, *se produit seul chez les animaux, la fermentation chez les végétaux, la putréfaction chez les animaux* ». Ecoutons ce qu'il dit de la fermentation : « *On distingue*, écrit-il, *deux espèces de fermentations : la fermentation propre, et l'acétification. La première est particulière aux moûts sucrés. Les décoctions de certaines plantes comme l'orge germée, peuvent aussi l'éprouver, mais après avoir subi une opération qui y développe le principe sucré. Elle a pour cause catharctique le ferment. Trop d'alcool l'arrête en préci-*

(1) R. Boyle. *Essai sur la partie pathologique de la physique.*

pitant le ferment, ou bien les parties les plus lourdes fermentifiantes. Elle est, aussi, empêchée par la chaleur; et du moût évaporé, puis étendu d'eau, de façon à être ramené à son état primitif fermenté beaucoup plus mal que le moût normal. Enfin la raréfaction subie par les constituants du mixte provient de la chaleur interne du ferment; car on voit toutes les petites bulles gazeuses qui se dégagent provenir de celui-ci. »

Si l'on veut bien relire ces lignes, on reconnaîtra qu'elles renferment exposées d'une façon à la fois concise, complète, et précise, toutes les qualités du ferment et ses conditions de développement. On peut leur reprocher sans doute de contenir en trop peu de mots trop d'idées originales et justes. Mais les successeurs de Becker n'auront qu'à les reprendre et les développer.

Jean Kunckel (1) faisait des théories de Becher une application bien curieuse. Il prétend, dans ses *Observationes chemicœ*, que les maladies d'estomac sont dues à des impuretés qui fermentent, et, pour le démontrer, il s'appuie sur ce fait que les acides et les plantes amères qui arrêtent la fermentation du moût sucré, sont capables de guérir les maladies d'estomac.

Mon Dieu ! cette conception serait-elle bien déplacée de nos jours ? En tous cas, le roi Charles XI, roi de Suède, tint son talent en haute estime, et pour le récompenser lui conféra les Lettres de Noblesse et le titre de *Conseiller Métallique*.

(1) J. Kunckel, né dans le duché de Schleswick en 1630, mourut en 1702, après avoir découvert le phosphore.

Ainsi, la question de la fermentation faisait de rapides progrès. Malheureusement les idées de Boyle, de Kunckel et de Becher arrivaient trop tôt. L'esprit humain est ainsi fait qu'il considère comme absurde ce qui ne lui semble pas banal, et Stahl allait en donner la preuve.

Stahl, qui s'était fait considérer *comme un des plus grands hommes que la médecine ait possédés*, et que l'on décorait alors du nom pompeux de *Nestor de la chimie*, Stahl avait, en qualité d'élève de Becher, toutes les facilités pour faire triompher les idées de son maître. Mais il était théoricien et avec lui *la dissertation reprit tous ses droits*.

Pour Stahl, il y a deux périodes dans la fermentation. Dans la première, les différentes molécules de la matière fermentescible s'agitent doucement, et des parties plus ou moins atténuées s'unissent ensemble. Dans la seconde, les parties se séparent du mixte en vertu du mouvement qui les anime, et les parties analogues se réunissent à l'exclusion des autres.

Le ferment n'intervient que pour communiquer son mouvement aux parties analogues de la liqueur fermentescible.

Stahl résume ainsi ses idées : « *tout corps amené à l'état de putréfaction transmet facilement cet état à un autre corps exempt encore de corruption. C'est ainsi qu'un pareil corps, entraîné déjà dans un mouvement intérieur, peut entraîner avec la plus grande facilité dans un semblable mouvement intérieur un autre corps*

encore au repos; mais disposé par nature à un pareil mouvement. »

Nous n'insisterons pas davantage sur cette hypothèse, peut-être inspirée par la théorie anatomique de Descartes qui venait de voir le jour ; et si nous lui avons consacré quelques lignes, c'est parce qu'elle renferme une conception curieuse, celle du mouvement intérieur, que nous retrouverons plus loin avec Liebig.

Du reste, l'étude de la fermentation ne languissait pas.

Black (1728-1799) arrive ensuite et découvre que l'acide carbonique et l'alcool sont les deux seuls produits de transformation du sucre dans la fermentation alcoolique.

C'était un nouveau progrès. Mais il restait à établir les relations entre ces trois éléments : le sucre d'une part, l'alcool et l'acide carbonique d'autre part. C'est ce que fit Lavoisier.

Lavoisier partait du principe suivant : « *Rien ne se perd, rien ne se crée, ni dans les opérations de l'art, ni dans celles de la nature, et l'on peut admettre* a priori *que, dans toute opération, il y a une égale quantité de matière avant et après l'opération, que la qualité et la quantité des principes est la même, et qu'il n'y a que des changements, des modifications* (1). »

Pour vérifier son principe, Lavoisier fait appel non plus à des hypothèses plus ou moins philosophiques ou séduisantes, mais simplement à la *balance*. Là est tout son mérite.

(1) Lavoisier. *Mémoire sur la fermentation alcoolique.*

Il pèse un vase rempli d'eau dans laquelle il avait jeté un poids donné de sucre et un peu de levure de bière. De la perte de poids subie par le vase à la fin de la fermentation, il conclut le poids de l'acide carbonique dégagé pendant le phénomène. Il sépare ensuite l'alcool par distillation, le pèse, et trouve que la somme des poids de l'alcool et de l'acide carbonique donne le poids du sucre primitif : et Lavoisier conclut que « *le sucre se dédouble simplement en acide carbonique et alcool, et qu'il n'y a pas d'autres produits normaux de la transformation.* »

Ainsi le problème de la fermentation se trouvait ramené à une formule bien simple ; formule malheureusement trop simple pour être complètement exacte et qui n'allait pas tarder à trahir son imperfection.

On s'aperçut en effet bientôt que les résultats de l'expérience de Lavoisier n'étaient qu'à peu près exacts : le poids total de l'alcool et de l'acide carbonique étant toujours un peu supérieur au poids du sucre employé.

Mais, exact ou faux, le travail de Lavoisier avait du moins le mérite d'être, avant tout, scientifique ; et la meilleure preuve c'est que son erreur a été, par la suite, une source de grands progrès.

Lavoisier, du reste, avait bien senti, lui aussi, que ses calculs n'étaient pas absolument exacts. Il avait essayé de les vérifier en recherchant si la relation pondérale qui existe entre le sucre d'un côté, l'alcool et l'acide carbonique de l'autre, se vérifiait individuellement pour chacun des éléments de ces corps. Le carbone du sucre devait se retrouver tout entier dans celui de l'alcool et

de l'acide carbonique. De même pour l'hydrogène et l'oxygène. Malheureusement, Lavoisier s'était trompé sur la composition du sucre et sur celle de l'alcool ; si bien que la vérification de son expérience la lui fit croire exacte.

Qu'importe après tout si l'expérience de Lavoisier n'a pas été d'une exactitude absolue ! qu'importe si la justesse de ses calculs est due à « une compensation tout à fait fortuite d'erreurs », comme le font ironiquement remarquer les apologistes de Pasteur ! son expérience a été féconde et cela supplée amplement à son imperfection.

Le savant n'avait envisagé le problème de la fermentation qu'au point de vue chimique (là est la cause de son erreur), et la solution purement chimique qu'il en a donnée nous satisfait largement.

Elle était au reste d'une simplicité tellement séduisante que des savants comme Gay-Lussac, et Thénard n'hésitèrent pas, au premier abord, à lui accorder toute confiance.

Et pourtant ces savants venaient d'établir la véritable composition du sucre et avaient reconnu par conséquent l'erreur des conclusions de Lavoisier. Qu'importe ? Le raisonnement de Lavoisier s'appuyait sur l'observation des faits et leur semblait irréfutable. « *Lavoisier, écrit Thénard en 1803* (1), *est le seul qui, éclairant du flambeau de son génie la chimie tout entière, marcha sans s'égarer dans cette route obscure* (*la fermentation*). *Ses*

(1) *Annales de chimie*, an XI, t. 46, page 296.

recherches sur la fermentation seront toujours un modèle à suivre dans l'analyse végétale. » Lavoisier avait dit que la fermentation vineuse résulte du dédoublement du sucre et de l'alcool en acide carbonique ; il n'y avait plus à aller contre.

Aussi **Gay-Lussac**, convaincu de la vérité de l'interprétation de Lavoisier, se contente de chercher si la formule du sucre, telle qu'il vient de la trouver par ses procédés perfectionnés, s'accommodait d'un dédoublement en alcool et en acide carbonique : les nombres que lui fournissent alors ses expériences sont en défaut de 2 à 3 p. 100. Eh bien, cela tient sans doute à une imperfection des procédés d'analyse, et Gay-Lussac n'hésite pas à les rectifier.

Faut-il, pour cela, l'accuser comme on dit vulgairement, « d'avoir donné un coup de pouce » aux nombres fournis par l'expérience « pour les faire entrer dans le cadre pypothétique tracé par Lavoisier ? » En ce cas, Pasteur lui-même a peut-être plus d'une fois encouru le même blâme. Et faut-il reprocher à des savants tels que Lavoisier, Gay-Lussac et Thénard de s'être laissé guider par des idées préconçues, et de continuer la tradition de ces alchimistes du moyen âge qui consentaient bien à consulter l'expérience, mais qui l'interrogeaient partialement et ne l'écoutaient que quand elle répondait suivant leurs désirs » ?...

Ces reproches sont sans doute inspirés par un désir excessif de réduire à néant tout ce qui n'est pas l'œuvre du maître : combinaison adroite dont l'Histoire ne tardera pas sans doute à faire justice.

Au reste, Gay-Lussac et Thénard avaient eu si peu l'idée de fausser *volontairement* leurs calculs que malgré cette extraordinaire « sécurité de conscience », qui déplaît si fort aux panégysistes de Pasteur, ils ne cachaient pas leur trouble devant l'incertitude des résultats de leurs expériences, et n'hésitèrent pas à reconnaître que la question n'était encore qu'imparfaitement résolue. Malgré tout son enthousiasme pour Lavoisier, Thénard écrivait : « *Quoique Lavoisier ait versé beaucoup de lumière sur cette partie de la science, l'obscurité qui l'enveloppait était si profonde qu'on ne la voit encore qu'au travers d'un nuage.* »

Il lui apparut alors évident que le problème de la fermentation comprenait deux parties :

Une partie chimique, qui était désormais nettement éclaircie ; puis une autre, celle-là plus délicate, dont on ne s'était pas assez préoccupé. C'est qu'en effet, et Thénard le savait bien, on avait jusqu'alors passé sous silence dans l'interprétation des phénomènes, la levure qu'il fallait ajouter à la liqueur sucrée pour en déterminer la fermentation, et sans laquelle il était impossible d'obtenir une fermentation.

Or, pourquoi cette levure si indispensable à l'expérience, ne figurait-elle pas dans les calculs ? Qu'était-ce donc au juste que cette levure et quel était exactement son rôle dans la fermentation ? C'est ce qu'il fallait désormais étudier.

Déjà en 1660, **Kumkel** avait remarqué que la levure de bière fournissait du sel volatil d'amoniaque quand on

la décomposait par la chaleur ; mais il ne s'était pas prononcé sur sa nature.

Boerhaave, lui, un peu plus tard, en fait nettement un végétal.

Or **Lœwenhoeck**, qui passa sa vie entière à faire des microscopes et à s'en servir, étudie en 1677 la levure de bière, et la trouve formée de *très petits globules sphériques ovoïdes*, mais la matière chimique de cette substance lui est inconnue.

Plus tard, il retrouve les mêmes globules « *dans la matière qui s'attache aux dents* ». Ne sachant à quoi attribuer l'origine des globules de cette matière, Lœwenhoeck suppose d'abord qu'il viennent de certaines nourritures où il en avait trouvé, comme dans le fromage ; « mais, comme il les rencontrait également chez ceux qui mangent du fromage et chez ceux qui n'en mangent pas, et comme ils ne ressemblaient en aucune façon aux mites, non plus qu'aux autres petites bêtes qu'on voit dans un fromage corrompu, il suppose que ces globules peuvent venir de l'eau de citerne que l'on boit, parce qu'il a observé des globules semblables dans l'eau du ciel, surtout dans celle qui a séjourné sur les toits. »

Qu'est ce que ces globules ? Tout ce que sait Lœwenhoeck, c'est qu'ils sont doués de mouvement. En tous cas, ce ne sont pas pour lui des êtres vivants ; il ne considérait comme tels que les globules qu'on trouve dans la liqueur séminale parce que ceux-ci possèdent une queue.

Nous verrons que Buffon, qu'avaient beaucoup intrigué les idées de Lœwenhoeck, ramenait à un même

élément les globules sans queue qu'on rencontre dans les infusions, et les globules avec queue qui se trouvent dans la liqueur séminale, c'est-à-dire, « *les animalcules permatiques* » de Lœwenhoeck. Cet élément commun, ce sera « *la molécule organique.* »

Avec la théorie des *Molécules organiques*, la fermentation s'explique facilement : « *toutes les substances animales et végétales renferment une grande quantité de cette matière organique et productive qui constitue les molécules organiques* ». Mais « *les particules actives de cette matière sont engagées dans des parties brutes, et pour les en séparer, il suffit de mettre les substances animales ou végétales infuser dans de l'eau. Alors les sels se fondent, les huiles se séparent et les parties organiques se montrent en se mettant en mouvement ; elles sont en plus grande abondance dans la liqueur séminale que dans toutes les autres substances animales, ou plutôt elles y sont dans leur état de développement et d'évidence, au lieu que dans la chair elles sont engagées et retenues par les parties brutes, et il faut les en séparer par l'infusion. Dans les premiers temps de cette infusion, lorsque la chair n'est encore que légèrement dissoute, on voit cette matière organique sous la forme de corps mouvants qui sont presque aussi gros que ceux des liqueurs séminales ; mais à mesure que la décomposition augmente, ces parties organiques diminuent de grosseur et augmentent en mouvement ; et quand la chair est entièrement décomposée ou corrompue par une longue infusion dans l'eau, ces mêmes*

parties organiques sont d'une petitesse extrême et dans un mouvement d'une rapidité infinie. »

Voilà comme Buffon se représentait la fermentation putride ; et cette interprétation, du reste, s'applique, d'après lui, à toutes les espèces de fermentation.

« *Lorsque*, dit-il, *le mouvement de ces petits corps est fort rapide et qu'ils sont eux-mêmes en très grand nombre dans la liqueur, elle s'échauffe à un point même très sensible, ce qui m'a fait penser que le mouvement et l'action de ces parties organiques des végétaux et des animaux pourrait bien être la cause de ce que l'on appelle fermentation.* »

Fabroni, en 1787, dans un mémoire sur les fermentations, couronné par l'Académie de Florence, identifie la levure avec le gluten. « Cela donnait une indication sur la place que doit occuper la levure parmi les produits organiques. C'était l'assimiler aux matières dites alors *animales*, c'est-à-dire qui fournissent de l'ammoniaque à la distillation. » Fabroni s'explique ainsi :

« *La fermentation n'est que la décomposition d'une substance par une autre, comme celle d'un carbonate par un acide ou du sucre par l'acide nitrique. La matière qui décompose le sucre est la substance végéto animale ; elle siège dans des utricules particuliers, dans le raisin, comme dans le blé. En écrasant le raisin on mêle cette matière glutineuse avec le sucre, comme si on versait un acide et un carbonate dans un vase ; dès que les deux matières sont en contact, l'effervescence ou la fermentation y commence, comme cela a lieu dans toute autre opération de la chimie.* »

La question de la fermentation réalisait ainsi un notable progrès.

Comme toujours, l'idée nouvelle souleva des protestations. C'est ainsi que Fourcroy, en 1799, résumant le travail de Fabroni dans les annales de chimie (1), le critique en ces termes :

« *Je ferai remarquer que la substance glutineuse que le citoyen Fabroni regarde comme l'espèce de ferment constant du sucre, ne paraît pas être la seule matière susceptible de cet effet, puisqu'il semble que la fécule, le mucilage, l'extractif même en petites portions sont également capables de faire fermenter le corps sucré, comme on le voit dans le sirop, les miels pharmaceutiques. Il est vrai que le citoyen Fabroni peut toujours dire qu'il y a plus ou moins de matière végéto animale, dans ces diverses substances ; mais il manque à sa théorie d'avoir prouvé la présence de cette matière dans le moût de raisin, et dans les sucres fermentescibles divers.* »

C'est ce même Fourcroy qui, en 1787, avait introduit dans la science l'expression de *fermentation alcoolique* pour remplacer celle de *fermentation spiritueuse* qu'il considérait comme consacrant une erreur.

La critique de Fourcroy n'empêcha pas Fabroni, dans un deuxième mémoire qu'il lut à la Société Philomatique de Paris, de préciser ainsi le rôle du gluten :

« *La fermentation vineuse est la réaction sur le sucre*

(1) Annales de chimie. *T.* XXXI.

d'une substance végéto-animale (le gluten) *que Becchari a découverte dans le froment.* »

En somme, Fabroni attribue la fermentation à la réaction du gluten sur le sucre.

La levure de bière acquérait ainsi désormais un rôle important dans le phénomène de la fermentation. Ce rôle allait devenir capital après les expériences de Thénard.

En l'an VIII, une année après la publication en France du travail de Fabroni, l'Institut proposa pour question de prix la question suivante : *Quels sont les caractères qui distinguent dans les matières végétales et animales celles qui servent de ferment de celles auxquelles elles font subir la fermentation ?*

Thénard essaya de résoudre le problème, et publia en l'an XI un Mémoire sur la fermentation vineuse (1). Dans ce travail, il recherche quelle est la nature de ce corps intermédiaire par le moyen duquel la matière sucrée se change en alcool et acide carbonique et comment il agit sur le sucre.

Depuis longtemps, cette question le préoccupait. Il avait reconnu, bien avant Pasteur du reste, que la démonstration de Lavoisier était incomplète. Il le dit lui-même. Mais avec une modestie qu'on aimerait à rencontrer chez tous les savants ; il ne craint pas d'affirmer que seul Lavoisier eût été capable d'achever la solution du problème : « *Lavoisier*, écrit-il, *a bien senti qu'il n'avait fait qu'ouvrir la carrière, qu'il lui restait à*

(1) *Annales de Chimie*, an XI. T. XLVI, page 294 et suivantes.

la parcourir. Il l'eût fait sans doute, si la mort, jalouse de sa gloire, ne l'avait point enlevé aux sciences. »

Thénard était donc. depuis longtemps déjà, convaincu *à priori* que ni la matière extractive, ni le mucilage, ni le tartre de fermentation vineuse ne pouvaient être des principes fermentescibles, comme on le croyait alors. Pour lui, il ne devait y avoir *qu'un seul ferment, partout le même.*

C'est donc guidé par l'idée que la levure doit jouer un rôle actif dans la fermentation que Thénard fit ses expériences sur le jus de groseilles. Il faut lire les détails qu'il en donne dans son mémoire, détails qui sont tout simplement une merveille d'observations, et qui ne laissent pas de séduire quand on réfléchit que ce mémoire a été écrit 57 ans avant le Mémoire similaire de Pasteur.

Il choisit le jus de groseilles de préférence à tout autre parce que, dit-il, « *c'est celui dont la fermentation est la plus prompte et la plus propre par conséquent à jeter du jour sur les causes qui la produisent.* » Laissons la parole à Thénard.

« *J'exprimai dans un linge d'un tissu serré le suc d'un kilog de groseilles; il était trouble et tenait en suspension une matière légèrement gluante que je séparai par le filtre et que je lavai à grande eau. Comme rien n'est à négliger dans les sciences d'observations et que le plus souvent le plus petit fait conduit à de grands résultats, je soumis cette matière à un examen suivi. Mon premier soin fut de la mettre avec du sucre*

et de l'eau pour savoir si elle serait susceptible de le faire fermenter. Bientôt en effet, je vis se dégager beaucoup de bulles d'un fluide élastique, que je reconnus pour être de l'acide carbonique. L'effervescence dura huit jours, et au bout de ce temps, la liqueur très agréable à boire, n'était plus que légèrement sucrée ; elle contenait beaucoup d'alcool, et imitait à s'y tromper, un vin qui n'est point encore totalement fait. »

Dès lors Thénard était bien convaincu que la substance qu'il cherchait était contenue dans la matière gluante employée. Or, il constate que « *un sixième seulement de son poids pouvait opérer la décomposition du sucre* ». Donc le principe fermentescible n'y était contenu qu'en petite quantité.

Mais quel était ce ferment ?

Comme il le trouve « *insoluble dans l'alcool et dans l'eau, sans action sur la teinture de tournesol, sur le bleu de violette* », il en conclut qu'il est de nature *animale*, c'est-à-dire qu'il est composé d'azote, d'oxygène, de carbone et d'hydrogène.

Il refait l'expérience, sur un litre de suc filtré et parfaitement clair. La fermentation produit un « *dépôt blanc, jaunâtre, gluant, sans saveur* » ; ce dépôt « *brunissait à l'air en se desséchant et y devenait légèrement acide. Projeté sur du charbon rouge, il y brûlait à la manière des matières animales ; distillé dans une petite cornue il donnait beaucoup de carbonate d'amoniaque. Il faisait fermenter le sucre avec une promptitude extrême.* »

Thénard conclut : « *que ce dépôt est une matière entiè-*

rement analogue à la levure de bière ». Or, cette levure, il la retrouve dans tous les jus sucrés en fermentation ; « *le moût de raisin*, dit-il, *et le suc de cerises, celui de poire, de pêche, de pomme, la décoction d'orge, de blé donnent en fermentant de la levure.* »

On savait aussi, Cullen l'avait remarqué, que le miel étendu d'eau, et l'urine des diabétiques se changent avec le temps en liqueurs spiritueuses.

Or, Thénard constate que cette transformation s'accompagne d'un dépôt de levure. C'est donc partout la même matière qu'on retrouve. Cette matière, Thénard l'appelle : *ferment.*

Ce ferment a des propriétés bien intéressantes qui n'échappent pas à notre savant : c'est ainsi, qu'il faut infiniment peu de ferment pour produire la fermentation. « *La quantité de ferment décomposé*, dit-il, *est très petite ; cent parties de sucre n'exigent que deux parties et demie de ce corps, supposé sec et pur pour leur décomposition totale.* » Mais ce n'est pas tout, ce ferment peut, par la dessication, perdre les trois quarts de son poids, et, une fois desséché, il est encore propre à déterminer la fermentation : « *et peut se conserver indéfiniment sans s'altérer.* »

L'eau bouillante, au contraire, le décompose, l'acide nitrique fait de même. Il n'y a donc plus de doute possible : « *le germe de la fermentation est de nature animale.* »

Maintenant quel est le rôle exact de ce ferment ? Thénard à fort bien senti que ce ferment devait avoir un rôle très actif dans la fermentation, et que celle-ci n'était

pas seulement un acte de dédoublement du sucre; comme l'avait établi Lavoisier. « *C'est en enlevant au sucre une partie de son oxygène*, dit-il, *que le ferment fait naître la fermentation.* »

Car le ferment « *a beaucoup d'attraction pour l'oxygène* ». Et ce n'est pas seulement au moyen d'une partie de son carbone que le ferment enlève de l'oxygène au sucre, mais encore au moyen d'une partie de son hydrogène.

Ainsi la fermentation résultait, dans l'esprit de Thénard, d'une association entre les éléments du ferment et ceux du sucre, d'une *décomposition* du ferment. Et Thénard montra que si on mettait ensemble vingt parties de levure fraîche et cent parties de sucre, on trouvait après la fermentation 13.7 parties d'un résidu insoluble, encore actif, et qui, épuisé par le contact d'une nouvelle quantité de sucre se réduisait à 10 parties. Or : « *ce dernier résidu était blanc, présentait toutes les propretés du ligneux et n'exerçait aucune action sur une nouvelle quantité d'eau sucrée* ». L'expérience était exacte et devait bien intriguer Pasteur.

Avec cette interprétation nouvelle, il restait un point à éclaircir : Où passe l'azote du ferment ? « *Il faudra voir*, dit Thénard, *dans son traité de chimie* (1), *ce que peut devenir l'azote du ferment décomposé. Il ne se trouve point mêlé au gaz carbonique ; il n'entre point dans la composition de la matière blanche insoluble ; il ne fait point partie d'une petite quantité d'une matière très*

(1) Thénard. *Traité de chimie,* 6e édition, t. V, page 65.

soluble que l'on trouve dans la liqueur avec l'alcool. L'alcool n'en renferme pas ; de sorte que la question de savoir ce que devient l'azote du ferment est encore à résoudre. »

Pourtant, les chimistes d'alors admettaient, d'après l'affirmation de Dœbereiner, que l'azote de la levure se retrouvait dans la liqueur à l'état de sel d'ammoniaque.

Mais Thénard n'avait pas donné foi à cette assertion.

À cette époque, la différenciation des différentes fermentations n'était pas encore bien nette.

Thénard eut assez de perspicacité pour voir, par exemple, que la fermentation *panaire*, que l'on considérait comme une fermentation spéciale, se composait, en réalité, de fermentation alcoolique et fermentation acétique : « *La levure ou levain, en agissant sur le sucre de la farine et sur celui qui provient de l'amidon donne lieu successivement aux fermentations spiritueuse et acide, et par conséquent à de l'alcool, de l'acide acétique et du gaz acide carbonique* (1). »

Cependant, Vogel assurait que la farine de froment dont il avait enlevé le sucre par d'abondants lavages à l'eau froide, était encore capable de fermenter lorsqu'on la mêlait à de la levure (2). Thénard répondit que *c'est parce que, une partie de l'amidon se changeait d'abord en sucre*. Du reste, Kirghoff avait déjà annoncé que : « *Quand on a mêlé du gluten pulvérisé à de l'empois*

(1) *Traité de chimie élémentaire*. 3e édition, t. IV. page 394.
(2) *Journal de pharmacie*, t. III, page 214.

d'amidon et égal en poids à la moitié de l'amidon que l'empois contenait, il s'est toujours formé du sucre dans l'espace de 10 à 12 heures. »

De même, l'acétification des liqueurs alcooliques était bien apparue à Thénard comme une simple fermentation qui, comme la fermentation sucrée, nécessitait le concours de la levure, c'est-à-dire d'un ferment.

« *L'alcool pur ou étendu d'eau*, écrit-il, *ne devient jamais acide par lui-même ; il le devient au contraire lorsque convenablement affaibli, on le mêle avec de la levure.*

Chaptal montrait, en même temps, que : *un litre d'eau-de-vie à 19° dans laquelle on délaie avec soin quinze grammes de levure et un peu d'empois produit du vinaigre extrêmement fort qui commence à se développer le cinquième jour de l'expérience.* « *On doit conclure*, dit Thénard, *que le ferment joue un rôle important et encore inconnu dans la conversion du vin en vinaigre.* » (1)

En somme, Thénard avait bien vu que la production d'alcool et d'acide carbonique par exemple est le résultat de différentes combinaisons chimiques entre le ferment et le sucre. C'était là un grand pas de fait dans l'explication du problème. Malheureusement Thénard avait constaté dans ses expériences une diminution de poids dans la levure pendant la fermentation ; et il en avait tout naturellement conclu que la formation d'alcool et d'acide carbonique doit-être le résultat de la des-

(1) Thénard : *Traite de chimie*, p. 494.

truction du ferment, alors qu'au contraire elle est la condition essentielle de sa vie et de sa multiplication.

Mais nous savons aujourd'hui que dans les circonstances de son expérience, son observation était exacte ; nous savons que dans un milieu épuisant comme de l'eau sucrée, la nourriture fait faute aux globules de levure ; les globules jeunes se développent aux dépens des vieux, et, comme il ne se forme pas assez de globules nouveaux pour compenser la perte de poids que les globules anciens subissent, il en résulte une destruction progressive de la levûre.

En même temps que Thénard, PROUST et Th. DE SAUSSURE faisaient d'actives recherches sur la fermentation putride. Mais, guidés par cette idée que la fermentation résulte de la décomposition du ferment, ils se cantonnent dans un cadre exclusivement chimique, et se contentent de rechercher dans quelles proportions les éléments du ferment s'associent aux éléments des corps en présence : sucre, eau, oxygène de l'air, pour former les nouveaux corps qui résultent de la fermentation.

Malgré tous ses efforts, Thénard, n'était pas parvenu à modifier beaucoup l'opinion des chimistes de son temps qui restaient disciples fidèles de Lavoisier. Cela, au reste, peut s'expliquer dans une certaine mesure, quand on réfléchit qu'à cette époque, la chimie s'annonçait comme devant tout expliquer, aussi bien les phénomènes de la nature que les phénomènes physiologiques. Sans doute les calculs de Lavoisier n'étaient pas tout à fait exacts ! Sans doute aussi la correction appor-

tée par Gay-Lussac était hypothétique ! Qu'importait ? Il était entendu que la vérité énoncée par le maître était absolue.

On juge de l'enthousiasme des esprits cultivés, lorsqu'en 1828 Dumas et Boulay montrèrent qu'on fait disparaître toute incorrection dans l'interprétation de Gay-Lussac en admettant que le sucre s'assimile les éléments d'une molécule d'eau avant d'être saisi par la fermentation alcoolique. Cette interprétation, conforme à l'expérience, rétablissait tout : la vérité de l'idée de Lavoisier, la correction des calculs de Gay-Lussac.

On ne se préoccupait pas, du reste, de savoir ce que venait faire cette molécule d'eau, ni quelle influence la faisait intervenir dans le phénomène ; on ne voyait qu'une chose : l'exactitude absolue de l'expérience de Lavoisier. Pour la chimie naissante, la levure était gênante, et on la faisait disparaître dédaigneusement des calculs. Et, du reste, pouvait-on attacher une importance à cette levure, « *espèce d'écume superficielle ou de dépôt de fond des cuves de brasserie ?* Vraiment elle paraissait trop peu de chose à des chimistes qui venaient de s'épuiser à résoudre un problème dont ils croyaient avoir trouvé la clef. Aussi pensait-on lui enlever toute importance en l'écartant dédaigneusement des calculs.

Pourtant quelques esprits, moins prévenus, se laissaient vivement intriguer par cette levure dont l'interprétation de Lavoisier ne tenait aucun compte, et dont la présence était indispensable pour mettre en train une fermentation.

C'est à ce moment (1825) que **Desmazières**, reprenant

une idée émise en 1680 par Lœvenhoeek et oubliée depuis, fait faire à la question un progrès assez sensible. Il étudie au microscope la constitution de la pellicule qui se forme à la surface de la bière et que Persoon, en 1822, avait appelée *mycoderma cerevisiœ.*

Le microscope était pourtant bien imparfait à cette époque. Il sut néanmoins reconnaître que la pellicule en question est formée d'une multitude de capsules hyalines ovoïdes, qui, d'après lui, peuvent se souder bout à bout pour former des tubes plus ou moins rameux. Il reconnut que ces tubes sont doués de mouvements particuliers ; il est convaincu de leur vie *animale* et les range parmi les *infusoires.*

Cagniard-Latour, en 1835, introduisit dans la question une idée nouvelle. Avant lui, on considérait la levure comme un principe immédiat des végétaux qui avait la propriété de se précipiter pendant la fermentation. C'est le microscope en mains qu'il entreprit ses recherches et étudia les phénomènes de la fermentation vineuse.

Déjà dans une lettre adressée à l'Académie des Sciences le 25 avril 1835, il déclare que *les grains dont la levure se compose ont une forme globuleuse, et que, très probablement, ces grains sont organisés.* »

Cette conception, du reste, ne lui était pas venue de prime abord ; il le dit lui-même : « *Il y a plus de vingt-cinq ans*, écrit-il lui-même en 1837, *que j'avais eu la curiosité d'examiner la levure fraîche au microscope. L'instrument dont je me servis alors était très imparfait ; aussi avais-je cru que cette levure était comme un*

sable très fin composé de grains cristalloïdes ; mais il est évident maintenant que j'ai été induit en erreur. »

Dans un mémoire présenté à l'Académie des Sciences le 12 juin 1837, il constate que les globules de levure sont « *en général simples, diaphanes, sphériques ou très légèrement allongés, et à peu près incolores.* » Pour lui, « *les globules de levure sont organisés* » ; ils sont si petits que « *dans un millimètre cube de levure en pâte ferme, il se trouve probablement un million pour le moins de ces individus globuleux.* » Fait important : « *Les globules de levain, pendant leur action sur le moût de bière, diminuent de volume et, par cette contraction, émettent des séminules, ou corps reproducteurs ; et l'on ne tarde pas à découvrir dans le moût des globules nouveaux. Ces globules nouveaux, qui ne s'apercevaient pas d'abord, paraissent avoir la propriété de se reproduire par bourgeons, et de pouvoir former ainsi des globules multipliés, c'est-à-dire soudés par deux, par trois.* » Les globules du ferment paraissent susceptibles de pouvoir se développer très promptement ; car, tandis qu'aussitôt après l'introduction du levain dans la cuve du brasseur, on ne trouve « *moyennement que dix-huit globules dans le champ du microscope armé d'un grossissement de 300 fois, on en trouve au contraire 80 à 100, 7 heures après la mise en levain.* »

En somme, pour Cagniard-Latour, d'une part, la levure est constituée par une multitude d'être vivants « *susceptibles de se reproduire par bourgeonnement* » ; et, d'autre part, « *ces corps vivants n'agissent sur le sucre que par l'effet de leur végétation.* »

Voilà qui ne laisse aucune équivoque ni sur la nature de la levure, ni sur son rôle dans la fermentation.

En même temps que Cagniard-Latour, **Kutzing** et **Schwann** (1835) firent en Allemagne les mêmes constations.

Schwann dit nettement que l'air est rempli de levures qu'il appelle *germes*, et que ce sont ces germes qui mettent en train la fermentation.

Gay-Lussac avait dit que l'oxygène de l'air suffisait à provoquer le dédoublement du sucre. Mais Schwann était convaincu qu'un être vivant était seul responsable du phénomène. Il fait arriver dans des flacons d'infusion de l'air qui passe dans un bain d'alliage fusible. Il n'obtient aucune fermentation. Il démontre ainsi que l'oxygène ne suffit pas à mettre en train une fermentation ; « *ce qui manque*, dit-il, *c'est quelque chose contenu dans l'air et que la chaleur détruit.* » Schwann va plus loin ; il précise la nature de ce quelque chose ; comme il l'a trouvé sensible à l'arsenic, il en conclut que c'est un germe *végétal* ; et si ce n'est pas un germe d'ordre animal, c'est simplement parce qu'il est insensible à l'action de la noix vomique, laquelle tue les animaux. Du reste, en 1835, il avait reconnu au microscope que les globules de la levure étaient des êtres vivants susceptibles de se reproduire par bourgeonnement. Bientôt il retrouve la levure dans le dépôt des boissons fermentées. Puis, il s'assure que la fermentation ne commence que quand il y a de la levure présente, et s'arrête dès que la levure cesse de se multiplier. Il fut ainsi tout naturellement amené à conclure que la fermentation est

fonction de la multiplication de la levure, que celle-ci se nourrit de sucre, et rejette sous forme d'alcool tout ce qu'elle ne peut employer.

Ainsi à la théorie purement *chimique* de la fermentation venait se substituer ou plus exactement se surajouter la théorie *vitaliste* telle que nous l'acceptons presque textuellement aujourd'hui.

Le problème était à peu près complètement résolu.

Malheureusement, le manque de précision de la nouvelle doctrine et son peu de développement, l'incertitude des expériences sur lesquelles elle s'appuyait, et puis surtout, sans doute, son caractère de vérité nouvelle lui firent refuser la confiance des esprits. N'est-ce pas à ce moment en effet qu'HELMOLTZ qui venait d'entreprendre une série de travaux sur la génération spontanée, affirma avec expériences à l'appui que : si les germes de l'air sont capables de déterminer la fermentation alcoolique, ils sont absolument inutiles à produire la putréfaction de la viande?

Aussi la théorie de Cagniard-Latour et de Schwann eut le sort de toutes les idées nouvelles qui font leur apparition dans une société imbue de préjugés. Du reste ; ce qui s'est passé à ce moment là n'est n'est pas un fait unique dans l'histoire. On a bien nié la possibilité de voyager en chemin de fer, et pourtant c'était une conception bien moins ardue que celle de la fermentation considérée comme phénomène vital. Un académicien, n'a-t-il pas crié à la supercherie et au ventriloque quand on a fait fonctionner devant lui le phonographe ? — Et pourtant il n'y avait qu'à ouvrir les yeux et les oreilles.

Rien d'étonnant, par conséquent, que devant les explications encore hésitantes de Cagniard-Latour et de Schwann, **Liebig**, qui avait placé toute sa foi, dans la chimie ait crié au scandale ; la chimie, en effet, venait de faire de si belles choses qu'elle s'était crue et qu'on l'avait crue capable de plus encore :

« Elle travaillait de son mieux à tout expliquer, jusqu'aux phénomènes les plus mystérieux de la vie par le simple jeu des forces physiques et chimiques. Et voilà que dans un coin reculé et mal connu de la science elle voyait apparaître sous forme de *Cause animée*, ces forces vivantes qu'elle expulsait peu à peu du domaine de la physiologie. Cela lui paraissait un recul. »

« *En quoi*, disait Liebig, *l'explication d'une fermentation vous paraîtra-t-elle plus claire, quand vous y aurez introduit un être vivant? Si encore il y en avait partout.*

Mais, vous voyez vous-mêmes qu'il n'y en a pas dans les putréfactions. Admettez, si vous le voulez, bien que cela paraisse fort extraordinaire, que la viande et le sucre se détruisent par des voies différentes. Mais le sucre peut subir des fermentations variées très voisines de la fermentation alcoolique et même l'accompagnant fréquemment : fermentations lactique, butyrique, etc... Trouvez-vous, dans ces fermentations, rien qui ressemble à de la levure? Ne se comportent-elles pas absolument comme des macérations de viande? Votre explication boite et rencontre des obstacles à chaque pas. Pour moi, au contraire, ces transformations présentent un caractère commun, c'est de s'accomplir toutes en

présence d'une matière organique en voie de décomposition. On met en train une fermentation lactique, butyrique au moyen de vieux fromages, de viande pourrie. Pour la fermentation alcoolique, Colin a montré, en 1828, qu'on pouvait la provoquer au moyen d'une foule de substances organiques azotées, différentes de la levure de bière à la condition qu'elles soient en voie de décomposition. Ce sont ces matières mortes qui sont le ferment. Je n'oublie pas, du reste, les expériences de Thénard, sur la production quasi constante de la levure de bière dans les jus en fermentation; je n'oublie pas davantage les conclusions de Cagniard-Latour et Schwann. Mais cette levure ne m'embarrasse pas; elle rentre dans mon système. Si vous admettez qu'elle vit, vous admettez aussi qu'elle meurt. Or, c'est en mourant qu'elle agit, par suite de la décomposition qu'elle subit à ce moment; de cela Thénard va vous fournir la preuve. »

Thénard avait vu, en effet, qu'en mettant vingt parties de levure au contact de cent parties de sucre candi, en dissolution dans l'eau, on obtenait une fermentation rapide et régulière, après laquelle la levure restante, réunie sur un filtre, ne pesait plus que 13 gr. 3. Mais au contact d'une quantité nouvelle et égale de sucre, ce résidu donnait une fermentation plus lente que la première fois, après laquelle il se réduisait à 10 grammes et était incapable de provoquer une fermentation nouvelle.

Cette expérience démontrait clairement aux yeux de

Liebig que la levure se détruisait et s'usait en agissant.

Toutefois, Liebig savait bien que dans la fermentation de la bière et du vin blanc, la levure, loin de s'user, ne fait, au contraire, qu'augmenter. Mais cette multiplication indéniable, il l'expliquait facilement : tous les liquides fermentescibles contiennent ce qu'il appelait du *gluten*, ce que nous appellerions aujourd'hui des *matières albuminoïdes*. Au contact de l'air, ce gluten s'oxyde et se précipite sous forme de levure.

En conséquence, à mesure qu'une partie de la levûre se détruit en agissant, une autre se reforme ; s'il s'en forme plus qu'il ne s'en détruit, c'est le cas dans la cuve du brasseur ; s'il s'en détruit plus qu'il s'en forme, c'est le cas de l'expérience de Thénard, dont nous parlions tout à l'heure.

Quant à l'explication profonde du phénomène, Liebig n'avait eu qu'à reprendre les idées de Willis et de Stahl, sur le mouvement intérieur d'une masse en fermentation, en attribuant au ferment la propriété motrice : « *La levure de bière, et en général toutes les matières animales et végétales en putréfaction, reportent sur d'autres corps l'état de décomposition dans lequel elles se trouvent elles-mêmes. Le mouvement qui, par la perturbation d'équilibre, s'imprime à leurs propres éléments, se communique également aux éléments des corps qui se trouvent en contact avec elles.* » Ainsi Liebig, sans nier ni accepter formellement l'organisation du globule de levure, se bornait à nier son rôle vital dans le phénomène de la fermentation. Pour lui la fermentation se

résumait dans « cette conception à demi mystique du *mouvement spontané.* »

A ce moment, une autre théorie, celle de Berzélius, admettait que le ferment n'avait qu'une action de présence et provoquait la décomposition de la matière organique, sans lui rien emprunter, et sans lui rien céder, en restant tel, à la fois, en quantité et en qualité, qu'il était au commencement. Mais cette théorie était restée dans l'ombre. Au contraire, la doctrine de Liebig, professée avec un rare talent par son auteur en 1839, fut acceptée de tous et prit la forme d'un dogme. C'est à ce dogme qu'allaient s'attaquer les quelques savants qu'elle ne persuadait pas.

Les expériences de Cagniard-Latour et son argumentation avaient manqué de précision ; de là était venue toute leur infortune. Il suffisait de les reprendre en y ajoutant un peu de clarté et de méthode pour les imposer aux esprits qu'elles n'avaient pas su captiver et anéantir du même coup la doctrine de Liebig. C'est ce qu'allait faire **Pasteur**.

Sur les causes qui ont conduit Pasteur à étudier les fermentations, il y a lieu de nous arrêter un instant.

Laissons d'abord parler Pasteur. Il dit, dans l'avant-propos de son mémoire sur la fermentation lactique (1) : « *On s'étonnera peut-être de me voir aborder un sujet de chimie physiologique bien éloigné de mes premiers travaux... J'ai établi que l'alcool amylique, contrairement à ce que l'on avait cru tout d'abord, était une*

(1) Annales de physique et de chimie 3e *série. T.* LII.

matière complexe formée de deux alcools distincts, isomères, l'un déviant à gauche le plan de polarisation de la lumière, l'autre dépourvu de cette action. La similitude des propriétés de ces alcools est extrême. Mais ce qui leur donne une valeur particulière dans la direction d'études que j'ai adoptées, c'est qu'ils ont offert la première exception connue à la loi de corrélation de l'hémiedrie et du phénomène rotatoire moléculaire. Je résolus alors de déterminer, s'il était possible, les causes de leur production simultanée et leur véritable origine sur laquelle certaines idées préconçues me portaient à ne point partager l'opinion commune. La constitution moléculaire des sucres me paraît très différente de celle de l'alcool amylique Si cet alcool, lorsqu'il est actif, avait le sucre pour origine, comme tous les chimistes l'admettent, son action optique serait empruntée à celle du sucre. C'est ce que je répugne à croire, parce que toutes les fois que l'on essaie de suivre la propriété rotatoire d'un corps dans ses dérivés, on la voit disparaître promptement. Il faut que le groupe moléculaire primitif se conserve en quelque sorte intact dans le dérivé, pour que ce dernier continue d'être actif, puisque la propriété optique est toute entière dans une disposition dissymétrique des atômes élémentaires. Or, je trouve que le groupe moléculaire de l'alcool amylique est trop distant de celui du sucre, pour que, s'il en dérive, il en retienne une dissymétrie d'arrangement de ses atômes. Je le répète, ce sont là des idées préconçues. Elles suffisaient cependant pour me déterminer à étudier quelle pourrait être l'influence du

ferment dans la production des deux alcools amyliques. » Et Duclaux conclut : « *Se rappelant alors que la vie est seule capable de créer de toutes pièces des dissymétries nouvelles, Pasteur se trouvait tout naturellement à interposer entre l'alcool et le sucre un être vivant, bref à faire de la fermentation un acte vital.* »

Or, que Pasteur ait fait sur le pouvoir rotatoire de l'alcool amylique les réflexions qui précèdent, rien d'étonnant : le résultat de ses recherches antérieures sur les propriétés optiques, chimiques et cristallographiques des corps l'y conduisait. Mais que cette subtile constatation ait été l'origine de ses études sur la fermentation, cela nous semble bien peu probable. Il eût été, il est vrai, tout à fait à l'honneur du raisonnement scientifique que Pasteur fût amené par une simple déduction à formuler la théorie vitaliste de la fermentation pour expliquer le phénomène chimique qui paraissait une anomalie. Mais cette théorie vitaliste était posée depuis longtemps et Schwann avait dit nettement que la levure se nourrit aux dépens du sucre et rejette sous forme d'alcool ce qu'elle ne peut employer.

Pasteur n'avait qu'à marcher dans la voie ouverte. Et son rôle restait tellement limité qu'il consacra son premier travail à la fermentation lactique. Or, la fermentation alcoolique était beaucoup plus importante au point de vue industriel, et il eut été plus naturel que Pasteur donnât tout d'abord au monde la solution qu'il attendait. Mais nous savons, et Pasteur savait bien que la fermentation alcoolique était déjà « *déflorée*, » c'est-à-dire par-

faitement connue depuis les travaux de Cagniard-Latour et de ses contemporains.

La fermentation lactique, au contraire, avait reçu de ces savants une interprétation que Liébig avait contestée.

Tout le monde savait, comme le dit Pasteur, qu'en ajoutant à de l'eau sucrée de la craie, plus une matière azotée telle que le caséum, le gluten, etc..., le sucre se transforme en acide lactique. FRÉMY et BOUTROY en 1841 avaient vu que la formation de l'acide lactique dans le bouillon de fermentation arrête au bout d'un certain temps l'action du caséum ; ils avaient vu aussi que, *en saturant de temps à autre le liquide par du bicarbonate de soude on arrive à transformer tout le sucre.* Puis PELOUZE et GÉLIS, en ajoutant de la craie au bouillon de fermentation, maintenaient ainsi constamment la neutralité, et l'opérateur n'avait plus à exercer aucune surveillance.

« *Cependant*, écrit Pasteur, *l'explication du phénoméne de la fermentation lactique restait très obscure ; des recherches minutieuses n'ont pu jusqu'à présent faire découvrir le développement d'êtres organisés. Les observateurs qui en ont reconnu, ont reconnu en même temps qu'ils sont accidentels et nuisent au phénomène.* »

Soit. Mais n'oublions pas que si Liebig, avec sa théorie du ferment considéré comme substance éminemment altérable et agissant par sa décomposition, avait contesté l'interprétation que Cagniard-Latour et Schwann avaient donnée de la fermentation lactique, celle-ci n'en existait pas moins. Le rôle de Pasteur devait donc se

borner à lui rendre le sens que ces deux derniers auteurs lui avaient donné, et que lui-même avait accepté.

Du reste, quelqu'un n'avait-il pas affirmé déja que toutes les fermentations devaient avoir un ferment pour origine ? Et le ferment lactique que Pasteur allait découvrir n'avait-il pas été déjà signalé par Rémak et Blondeau ?

Rien donc de plus naturel pour Pasteur que d'étudier ce ferment.

Il s'y attache et le trouve d'ailleurs analogue à la levure de bière. « *Au microscope*, dit-il, *cette levure est formée de petits globules ou d'articles très courts, isolés ou en amas, constituant des flocons irréguliers. Les globules sont beaucoup plus petits que ceux de la levure de bière... Cette levure peut être recueillie et transportée au loin sans perdre son énergie. Son activité n'est qu'affaiblie quand on la dessèche ou qu'on la fait bouillir avec de l'eau... Il faut très peu de cette levure pour transformer un poids considérable de sucre... Nous retrouvons là tous les caractères généraux de la levure de bière.* » Ce ferment se multiplie comme elle et forme au fond des ballons un dépôt grisâtre dont une trace suffit pour mettre en train une fermentation. Enfin, ce ferment, comme tout être vivant, a ses exigences : « *sa pureté, son homogénéité, son développement libre sans aucune gêne à l'aide d'une nourriture très bien appropriée à sa nature individuelle, voilà*, dit Pasteur, *l'une des conditions essentielles des bonnes fermentations.* »

Ayant ainsi confirmé, en les précisant, les idées de Schwann, sur la fermentation, Pasteur termine son mé-

moire par cette conclusion bien intéressante en ce qu'elle nous donne l'idée exacte qu'il se faisait de la fermentation en général. « *Il m'est avis, au point où j'en suis de mes connaissances sur ce sujet que quiconque jugera avec impartialité les résultats de ce travail, reconnaîtra avec moi que la fermentation s'y montre corrélative de la vie, de l'organisation de globules, non de la mort ou putréfaction de ces globules, pas plus qu'elle n'y apparaît comme un phénomène de contact où la transformation du sucre s'accomplirait en présence du ferment sans lui rien donner, sans lui rien prendre.* »

On ne peut s'empêcher de constater ce que cette interprétation de la fermentation a d'incertain et d'hésitant. On y lit que la fermentation est un phénomène corrélatif d'un acte vital. Mais Pasteur n'y affirme pas que la fermentation est l'acte vital lui-même. Du reste, Pasteur avoue à la fin de son mémoire que rien de ce qu'il a dit n'est démontré. « *Si on venait me dire que, dans mes conclusions, je vais au-delà des faits, je répondrais que cela est vrai, en ce sens que je me place franchement dans un ordre d'idées qui, pour parler rigoureusemeut, ne peuvent être irréfutablement démontrées.* » Cet aveu constitue pour nous la preuve qu'à ce moment (1858) Pasteur n'était guère encore que le disciple de ses devanciers dans la doctrine vitaliste de la fermentation ; il avait été frappé par la justesse de leurs idées ; il leur avait emboîté le pas, et c'est parce que leur système lui paraissait parfaitement logique, qu'il se donnait « *le plaisir d'y croire.* »

Deux ans plus tard, il publie son Mémoire sur la fermentation alcoolique. Ses idées se précisent et s'affirment plus nettement. Dans ce mémoire, il s'attache d'abord à démontrer que l'interprétation proposée par Lavoisier est fausse : ce qui était déjà reconnu du reste, puisque depuis Schwann on savait que dans toute fermentation il entre un élément vital dont Lavoisier n'avait tenu aucun compte. Pasteur complète ensuite l'équation de Lavoisier en montrant qu'outre l'alcool et le sucre il se forme toujours de l'acide succinique et de la glycérine : rectification tout à fait exacte, mais qui avait le seul défaut de n'être pas nouvelle.

Dès 1856, en effet, DUFUNFRAUT avait démontré que les choses ne se passaient pas aussi simplement que l'avait cru Lavoisier, et qu'il faut rendre compte, dans l'expérience, de la production d'une certaine quantité d'acide succinique et de glycérine. Il avait même vu que *si, pour un poids donné de sucre, les quantités d'alcool et d'acide carbonique produites sont constantes, au contraire les quantités de glycérine et d'acide succinique sont variables et d'autant plus abondantes que la fermentation est plus lente el la levure moins active.*

Quoi qu'il en soit, le côté chimique du problème était enfin complètement éclairci.

D'autre part, nous savons que Liebig, s'appuyant sur une expérience célèbre de Thénard, soutenait que c'est aux dépens des matières organiques en décomposition que la fermentation s'effectue : « *c'est en mourant que la levure agit par suite de la décomposition qu'elle subit à ce moment.* » Pasteur était ainsi amené à con-

cevoir la fameuse expérience par laquelle il montra qu'une semence de levure peut fort bien prospérer dans un liquide privé de toute matière organique azotée. Il Il composa un milieu ne contenant que du sucre candi parfaitement pur, divers sels minéraux destinés à fournir aux globules de levure les éléments de leur squelette, et un sel ammoniacal destiné à lui fournir l'azote. Dans ce milieu tout artificiel, il vit la fermentation se produire, et la cellule de levure se multiplier. Or, pour se développer, celle-ci devait emprunter tous les éléments de ses tissus, non pas à la matière organique puisqu'il n'y en avait pas, mais au sucre et à l'ammoniaque ; le sucre lui fournissait le carbone, et l'ammoniaque l'azote.

Hâtons-nous de faire remarquer, du reste, que ce milieu minéral propre au développement de la levure ne fut pas trouvé du premier coup.

Mais, quand après quelques tâtonnements, l'expérience eût réussi, la théorie de Liebig avait vécu. On avait en même temps l'explication de l'expérience de Thénard qui avait vu la levure ensemencée dans l'eau sucrée diminuer de poids. On comprend que la levure a beaucoup plus de peine à vivre dans un milieu purement minéral où elle doit former tous les matériaux constitutifs de ses tissus, que dans du jus de raisin ou du moût de bière, où elle trouve tout faits des éléments utilisables. Or, si au lieu d'un milieu composé de sels minéraux et d'ammoniaque, un milieu chimique complet, en somme, comme celui qu'utilisait Pasteur, on se sert uniquement d'eau sucrée comme l'avait fait Thénard, on comprend que la levure aura plus de difficultés encore à s'y déve-

lopper, et que les globules nouveaux seront obligés, pour vivre, d'emprunter leur nourriture, non pas au milieu, lequel n'a rien à leur service, mais aux globules anciens ; *les jeunes mangent les vieux*. Et comme il ne se forme pas assez de globules nouveaux pour compenser le nombre de globules vieux épuisés, eh bien ! le poids total de levure diminue.

Cette expérience confirmait tout naturellement la théorie vitaliste de la fermentation.

En même temps, Pasteur montrait qu'une fermentation donnée est due à un ferment donné ; que le ferment lactique, par exemple, lequel a la forme d'une petite cellule étranglée en son milieu, est bien différent du ferment alcoolique, lequel est une cellule plus grosse, d'aspect plus compliqué, dont l'intérieur est composé d'une masse différenciée, tandis qu'elle est homogène dans le ferment lactique. On avait, jusqu'alors, étudié surtout la levure de bière, et on la croyait capable de produire toutes sortes de fermentations. Du reste, on n'était pas bien fixé à cet égard, et Boutroy et Frémy enseignaient que des fermentations successives pouvaient se dérouler dans un même milieu, avec ou sans ordre, suivant le mode et le progrès de la décomposition de la matière azotée. On croyait encore que les fermentations butyrique et mammitique accompagnent la fermentation lactique. Pasteur montra précisément que chaque ferment est *spécifique*, et que le ferment lactique, par exemple, ne peut pas plus donner de l'alcool que le ferment alcoolique ne donne de l'acide lactique. Il montra enfin que si plusieurs fermentations peuvent fonctionner

dans le même bocal, cela tient à ce que les germes y sont mélangés, et qu'au contraire cela n'arrive plus dès qu'on cultive dans des bouillons nutritifs et limpides un ferment pur.

Remarquons, il est vrai, que Pasteur était tout naturellement conduit vers cette conception de la spécificité des ferments, par ses travaux et par des travaux antérieurs. En effet, on connaissait la levure de bière sous le nom de *Cryptococcus cerevisiæ*, nom que Pasteur change en celui de *Fermentum alcoolicum*; — le ferment lactique avait été signalé par Remak et Blondeau; — Jacquemart avait découvert le germe qui produit la fermentation ammoniacale de l'urine; Müller et Van Tieghem l'avaient étudié ensuite.

La fermentation putride était, depuis Ehremberg, rapportée à deux espèces de ferments : les uns, qui vivent sans oxygène et agissent comme les bactéries de la fermentation butyrique; les autres, analogues au mycoderma aceti, vivent au contact de l'air sur les matières acides. Le mycoderma aceti avait été signalé par le botaniste Persoon (1) en 1822, puis étudié par Desmazières (2) en 1826.

On voit qu'il suffisait de rassembler les faits disséminés dans l'histoire pour conclure à la spéficité des ferments. Nous n'en voulons pour preuve que le fait suivant : pendant qu'il recherchait le ferment butyrique, Pasteur trouve dans le liquide de fermentation des bâ-

(1) Persoon. *Mycologia Europœa*, t. I, p. 96.

(2) Desmazières. *Annales des Sciences naturelles*, 1re série, T. X.

tonnets allongés et mobiles. Etonné, il refuse de leur accorder aucun rôle dans la fermentation butyrique ! Pourquoi ?

Tout simplement parce que ceux-ci n'ont aucun caractère qui les rapproche des ferments déjà connus : ils sont animés de mouvements ondulatoires, au lieu que les véritables ferments sont immobiles ; ils sont allongés, en bâtonnets, au lieu que les levures sont toujours de forme globuleuse !

Et cette hésitation de Pasteur ne fut pas celle d'un moment. Ecoutez Pasteur :

« *J'étais bien éloigné*, dit-il, *de m'attendre à un pareil résultat, à tel point, que pendant longtemps j'ai cru devoir appliquer mes efforts à écarter l'apparition de ces petits animaux, par la crainte où j'étais, qu'ils ne se nourrissent du ferment végétal que je supposais être le ferment butyrique, et que je cherchais à découvrir dans les milieux liquides que j'employais. Mais n'arrivant pas à saisir la cause de l'origine de l'acide butyrique, je finis par être frappé de la coïncidence que mes analyses me montraient inévitable entre cet acide et les infusoires, et réciproquement entre ces infusoires et la production de cet acide... Il faut les considérer comme le véritable ferment butyrique.* »

Les idées de l'époque, idées que Pasteur avait adoptées, attribuaient aux levures une nature végétale. Schwann n'avait-il pas écrit qu'il considérait la levure comme un germe *végétal* (c'est sa propre expression), parce qu'elle est sensible à l'arsenic qui tue les végétaux, et non comme un germe animal, parce qu'elle ré-

siste à la noix vomique, laquelle tue les animaux? Or, les corps qu'on trouvait dans la fermentation butyrique étaient mobiles : donc c'étaient des animaux; donc ce n'était pas le ferment cherché, lequel devait être *a priori* un être végétal, c'est-à-dire un corps *immobile*.

Chose curieuse, et qui aurait dû préserver Pasteur de son erreur, c'est que ces vibrions avaient déjà été remarqués par Ehremberg et Dujardin dans les infusions en 1841 (1).

Cette même hésitation, nous la retrouvons chez Pasteur quand il lui faut se prononcer définitivement sur la nature intime de la fermentation en général. Pasteur n'affirme pas le caractère purement vital de la fermentation. Même, dans son mémoire de la fermentation alcoolique, si longuement développé, il semble considérer le phénomène de la fermentation d'une part, et le développement des levures d'autre part, comme deux choses différentes : il parle de la fermentation comme on parlerait de la respiration. Or, la respiration n'existe pas plus sans les cellules pulmonaires, que la fermentation sans les cellules de levure. Ainsi il dit : « *L'acte chimique de la fermentation est essentiellement un phénomène corrélatif d'un acte vital.* » Et plus loin : « *Dira-t-on que la levure se nourrit de sucre pour le rendre ensuite sous forme d'alcool et d'acide carbonique ?... Dira-t-on, au contraire, que la levure produit en se développant une matière telle que la pepsine, qui agit sur le sucre et disparaît aussitôt épuisée ? Je n'ai rien*

(1) Dujardin. *Histoire nat. des infusoires.*

à répondre au sujet de ces hypothèses. Je ne les admets, ni ne les repousse. »

Pourquoi ces réticences ? Pourquoi cette incertitude ? Dans ce mémoire, Pasteur compare les cellules de levure aux cellules de la glande mammaire : « *Les globules de levure auraient pour fonction la transformation du sucre à peu près comme les cellules de la glande mammaire transforment les éléments du sang dans les divers matériaux du lait.* » Or, il nous semble que l'état des connaissances sur la fermentation ne permettait pas une telle comparaison, qui, au fond, constitue une erreur. La fermentation n'est pas une fonction surajoutée à la vie des levures, comme la sécrétion du lait aux cellules mammaires. C'est leur vie elle-même.

En 1864, le professeur Béchamp avait si bien compris cette distinction, à nos yeux capitale, qu'il définit ainsi la fermentation : « *Pour moi, dit-il, la fermentation alcoolique et les autres fermentations par ferments organisés ne sont pas des fermentations proprement dites : Ce sont des actes de nutrition, c'est-à-dire de digestion, d'assimilation, de respiration, de désassimilation. La levure transforme d'abord hors d'elle-même le sucre de canne en glucose par le moyen d'un produit qu'elle contient tout formé dans son organisme et que je nomme zymase : c'est la digestion. Elle absorbe ensuite le glucose et s'en nourrit. Elle assimile, se multiplie, s'accroît et désassimile ; elle assimile ; c'est-à-dire qu'une portion de la matière fermentescible modifiée fait momentanément ou définitivement partie de son être et sert à son accroissement et à sa vie. Elle désassimile, c'est à-*

dire qu'elle rejette au dehors les parties usées de ses tissus sous la forme des composés qui sont les produits de la fermentation » (1).

Voilà, exposée en termes qui n'ont rien d'ambigu, la théorie de la fermentation considérée comme phénomène de nutrition. Peut-on insinuer que cette théorie n'a qu'un intérêt « philosophique » ?

Cela ne semble guère possible, quoi qu'en pense Duclaux. A l'époque où le professeur Béchamp exposait ce qu'on vient de lire. Pasteur considérait la fermentation comme un phénomène corrélatif d'un acte vital, Béchamp affirme que la fermentation est l'acte vital tout entier.

Un peu plus tard, Pasteur faisait encore quelques restrictions sur la nature essentielle de la fermentation : « *Ce qui sépare les phénomènes chimiques des fermentations d'une foule d'autres, dit-il, et particulièrement des actes de la vie commune, c'est le fait de la décomposition d'un poids de matière fermentescible bien supérieur au poids du ferment en action* » (2). De son côté, Duclaux écrivait à la même époque (3) en reproduisant les idées de son maître : « *Il est bien difficile de croire que dans une fermentation alcoolique, le sucre a fait, à une époque quelconque, partie des matériaux de la levure, et que l'alcool est quelque chose comme un produit d'excrétion* ». Ainsi, l'élève de Pasteur niait pure-

(1) Comptes rendus de l'Académie des Sciences, 4 avril 1864, page 602.

(2) Comptes rendus, Acad. des Sc., 1872, p. 785.

(3) Annales Scientifiques de l'Ecole n. sup., t. II, p. 249.

ment et simplement la théorie de la fermentation formulée par le professeur Béchamp.

A cette insinuation, le professeur Béchamp répondait :

« *On se demande si les composés qui constituent les produits de la fermentation viennent du sucre ou de la levure. Ils doivent forcément venir tous de la levure, de même que l'urée et les autres produits que nous expulsons viennent toujours de nous, c'est-à-dire des matériaux qui ont d'abord composé notre organisme, quel qu'ait été le genre d'alimentation précédent ou l'état d'inanition actuel. De même que le sucre vient du foie et non des aliments directement, de même l'alcool vient de la levure* ».

Et comme preuve à l'appui de cette magistrale interprétation, le professeur Béchamp démontre expérimentalement que la levure, bien qu'elle ne contienne pas de glucose, peut néanmoins fournir de l'alcool. Donc « *cet alcool vient des matériaux des tissus qui composent cette levure ; donc le sucre n'est pas directement nécessaire à la formation de l'alcool puisque la levure en produit sans glucose, de même qu'un animal rendu carnivore d'herbivore qu'il était ne forme pas moins du sucre dans son organisme* ».

C'est le professeur Béchamp qui a aussi établi péremptoirement la relation entre le ferment figuré et le ferment soluble.

Quoi qu'il en soit, il reste donc bien établi que, lorsque Pasteur eût « débrouillé toutes les obscurités qui

planaient sur la question des fermentations », il aboutit à dire ce que d'autres avaient dit avant lui.

Mais comme on voulait faire de Pasteur une gloire nationale, un symbole de la science française, il fallait à tout prix, on le conçoit, rabaisser, obscurcir, éliminer même tous ceux qui, de près ou de loin avaient touché aux questions qu'il lui plut d'aborder. Cette admiration exclusive tourna même au délire ; et Pasteur fut désormais considéré à peu près comme un Christ de la Science nouvelle.

Cependant, au sein de ce concert dithyrambique d'éloges et de glorifications, quelques voix, dont l'autorité est chose acquise, se sont déjà élevées pour protester.

C'est ainsi que le professeur Grasset, de Montpellier, dans un discours prononcé à Lille en 1899, s'exprime ainsi : « *Dans la démonstration de la loi, la fermentation est toujours fonction d'un être vivant. Pasteur a été, sinon précédé, du moins accompagné par un de mes premiers maîtres, le professeur Béchamp, aux travaux duquel on n'a pas suffisamment rendu justice.* »

Nous avons cité dans ce trop court travail les noms de ceux qui ont consacré leurs efforts à la solution du problème des fermentations et dont quelques-uns ont joué un rôle prépondérant dans cette question. A l'Histoire il appartient de les préserver d'un oubli qui les menace et de leur rendre l'hommage auquel ils ont droit.

CONCLUSIONS

En résumé, nous pouvons conclure qu'au point de vue des fermentations, il s'est passé pour les découvertes de Pasteur ce qui, en général, advient pour toutes les grandes innovations. Elles ont été l'œuvre d'une époque plutôt que l'œuvre d'un homme. Et quand je dis l'œuvre d'une époque, je devrais dire l'œuvre de plusieurs époques.

C'est qu'en effet le problème de la fermentation, avant de nous arriver tel que nous le concevons aujourd'hui, avait passé par plusieurs phases.

1° Dans une première phase pleine d'incertitudes et d'obscurités, on ne voit guère dans la fermentation que *matière à philosopher*. Çà et là, quelques lueurs jettent au milieu du chaos des dissertations abstraites et diffuses une note qui semble discordante et dont l'écho est vite étouffé.

2° Puis la philosophie ayant épuisé toutes les ressources de sa rhétorique et de son mysticisme, le problème entre

dans une deuxième phase. C'est une période de réaction ; la méthode expérimentale, qui vient de naître, arrive comme un Messie et promet de déchiffrer toutes les énigmes du problème. A la métaphysique elle substitue la *chimie*. Elle s'inaugure alors par les belles expériences de Lavoisier, devant lesquelles le monde reste un moment étonné.

Mais on oublie que la vérité scientifique ne s'élabore que lentement. La nouveile méthode veut trop expliquer et trop vite. Et son ambitîon contribue à sa faillite. En vain, ses apôtres, les Gay-Lussac et les Thénard, s'acharnent-ils à étayer leur doctrine sur des bases solides. Ils sentent que la chimie seule est insuffisante à soutenir le poids d'un pareil édifice. Alors, pour un moment, l'imagination reprend ses droits avec Berzelins et Liebig.

3° Mais, convaincus que les bases jetées par Lavoisier et ses disciples étaient bonnes et que leur seul défaut était leur insuffisance, Schwann et Cagniard-Latour les fortifient et les complètent. Nous entrons avec eux dans une troisième phase : aux données chimiques du problème, on surajoute un élément *physiologique*, *vital*. Dès lors, l'édifice des sceptiques s'effondre, et la science de la fermentation n'a plus, dès lors, qu'à se préciser et à développer quelques points de détail pour rester à jamais maîtresse du problème.

Ainsi, la théorie définitive de la fermentation avait été donnée bien avant la publication retentissante du mémoire de Pasteur sur la fermentation lactique ; mais, comme à cette époque, à côté des explications fournies par des savants tels que : Lavoisier, Thénard, Cagniard-

Latour et Schwann, les idées embrouillées de raisonneurs tels que Liebig cherchaient et parvenaient effectivement a hypnotiser les esprits, Pasteur eut le mérite de jeter le cri d'alarme et de ramener la science dans la voie plus sûre où Cagniard-Latour et Schwann n'avaient pas réussi à la maintenir. Il n'a pas découvert la solution du problème de la fermentation comme on l'a prétendu ; il a même eu de fréquentes hésitations au cours de ses recherches. Mais ses hésitations même l'ont contraint à multiplier ses expériences, et ce n'est qu'à force d'observations précises qu'il a pu, avec la collaboration d'ailleurs de ses contemporains, lever définitivement le voile dont on couvrait si obstinément le problème des fermentations. S'il n'a pas inventé, il a précisé et perfectionné.

Il a surtout perfectionné une méthode bien chère aux biologistes d'aujourd'hui, la méthode expérimentale. Il savait que cette méthode est aussi fragile qu'elle est précieuse, et que l'expérience la mieux conduite est toujours menacée du doute. C'est sans doute pour cela qu'il contrôlait avec tant de scrupule les moindres détails de ses observations.

Il ne faut pas perdre de vue, en effet, que dans le domaine physiologique surtout, c'est le propre des vérités scientifiques d'être tour à tour vraies et fausses. Le progrès de la science n'est fait que de jugements sans cesse révisés, et comme il faut croire à ce progrès, on est en droit, du moins, de n'accepter qu'avec une confiance limitée, les formes qu'il revêt successivement. Pasteur pensait sans doute de même, puisqu'il regardait chacune

des découvertes de la science comme un rêve, différent de l'illusion en ce que c'est un rêve qui est fécond et qui aboutit.

Vu : Le Président de la Thèse,
DÉJERINE.

VU : LE DOYEN,
DEBOVE.

Vu et permis d'imprimer :
Le Vice-Recteur de l'Académie de Paris
L. LIARD.

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With the President's Compliments

THE ANNUAL ADDRESS

DELIVERED TO THE

ROYAL COLLEGE OF PHYSICIANS OF LONDON

On Monday, April 14, 1924

BY

THE PRESIDENT

SIR HUMPHRY ROLLESTON, K.C.B., M.D., D.C.L., LL.D.



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PRESIDENTIAL ADDRESS.

At the end of the Presidential year it has long been the custom to review the position and activities of the College and to read obituary notices of the Fellows who have passed beyond these voices. In the College Annals the first mention of any address is in 1862 when, after his first election, Dr. (afterwards Sir) Thomas Watson thanked the College; the first address in the possession of the College is Sir Thomas Watson's in 1866. It may be noted that before 1861 the President was elected, not by the Fellows, but by, and it would appear out of, the limited body of the eight Elects.

At the present time there are 371 Fellows of the College, as compared with 87 in 1824; of the present Fellows 12 have been elected under Bye-law XL (*b*) enacted 26 January, 1911, whereby registered medical practitioners not members of the College, who have distinguished themselves in any branch of the science or practice of Medicine, can be elected Fellows. Of these 12 there are 9 Fellows of the Royal Society.

Analysis of the present 371 Fellows appears to show that 258, or 67 per cent., are in practice as ordinarily understood; 165 of these are resident in London, 82 in the country, and 11 out of Great Britain. Of the remaining 113 Fellows 45 are or were in the Naval, Military or other Services, 19 are whole-time professors, and 49 are believed to have retired from ordinary practice; of these 49 there are 39 whose former sphere of activity was in London and 10 in the Country. London University heads the list with 146, or 39 per cent., of the 371 Fellows, then follow Cambridge with 97, or 26 per cent., Oxford with 52, or 14 per cent., Edinburgh with 35, or 9 per cent., Durham and Manchester 7, or 2 per cent., each, and Aberdeen with 4. Fifty years ago (1874) Edinburgh University headed the list, closely followed by London, and then came Cambridge, Oxford, and St. Andrews.

The number of Members on 1 January, 1924, was 636 as compared with 600 a year ago and 454 in 1900. Ten have died, and seven have been restored. There is one extra-Licentiate (1857).

The Licentiates number 14,902 as compared with 14,448 a year ago and 8,188 in 1900. During the year 182 have died, 25 have become Members, and 2 have been restored.

The Diplomates in Public Health number 1,088, in Tropical Medicine 212, in Ophthalmic Medicine and Surgery 88, in Psychological Medicine 55, and in Laryngology and Otology 2.

The steadily increasing number of Licentiates and Conjoint Diplomates has made the College List so unwieldy in size that it has been divided into two volumes. Vol. I contains all the matter that was in the previous single volume with the exception of the Lists of Licentiates and Conjoint Diplomates, which now form Vol. II, and with the exception of the Country List of Fellows and Members which has been omitted. Vol. I will be sent to every Fellow and Member annually. Vols. I and II will be sent to every new Licentiate when he takes his Diploma. Any Fellow or Member can have a copy of Vol. II (in addition to Vol. I) on application. The Treasurer, Dr. Sidney Phillips, has rewritten the brief accounts of the Lecture Trusts in Volume I of the List.

HONOURS.

The following honours have been conferred by His Majesty the King on Fellows, Members, Licentiates and Diplomates of the College during the year 1923-24 :—

Baronetcy : Sir Donald MacAlister (Fellow),
Sir Thomas Horder (Fellow).

K.C.B. : Sir William B. Leishman (Fellow).

K.C.V.O. : Arthur Reginald Bankart (Diplomate in Public Health).

Knighthood : Hector Mackenzie (Fellow).
W. J. R. Simpson (Fellow).
George Blacker (Fellow).
Ewen J. Maclean (Fellow).
Byrom Bramwell (Fellow).
Chichester Gould May (Member).
Harry George Waters (Licentiate).

C.B. : William Percival Hingston (Licentiate).

C.M.G. : Thomas R. St. Johnston (Licentiate).
C.I.E. : R. McCarrison (Fellow).
Behari Lal Dhingra (Licentiate).
O.B.E. : R. B. Ainsworth (Licentiate).
T. J. Hallinan (Licentiate).
M.V.O. (4th Class) : H. L. Martyn (Licentiate).
F. J. Willans (Licentiate).

Your President has been appointed Physician-in-Ordinary and Dr. E. Farquhar Buzzard Physician-Extraordinary to his Majesty the King.

HARVEIAN CELEBRATION.

In his Harveian Oration "On the Wisdom of the Body," Professor E. H. Starling dealt with the physiology of the heart and of the endocrine glands—subjects to which he has made such important permanent additions to our knowledge. This authoritative oration recalled the last Harveian Oration by a Professor of Physiology—that by a predecessor of his at University College, the late Sir John Burdon Sanderson in 1878. At the usual Dinner in the evening there were present 15 guests and 66 Fellows.

RECEPTIONS.

On the occasion of the Congress of the Société Internationale de Chirurgie, held for the first time in London, the College gave a reception to the members and their wives on 19 July, 1923, from 4 to 6 p.m. About two hundred guests were entertained and had the opportunity of seeing a large number of early works on anatomy and surgery illustrating the history and nomenclature of these subjects, selected by the Harveian Librarian.

On the evening of 3 January, 1924, the College received the members of the Classical Association then meeting in London; the Harveian Librarian arranged an exhibition of early and rare editions of works dealing with theology, classics, mathematics, medicine, and comparative anatomy; manuscripts, prints, and old silver were also on view.

There were 114 acceptances (44 being ladies) from the Classical Association and from about 100 Fellows of the College.

LECTURES.

In his Oliver-Sharpey Lectures on 1 and 3 May, 1923, on " The Activity of the Capillary Blood Vessels, and its relation to certain forms of Toxaemia," Dr. H. H. Dale gave a masterly review of the recent advances in a subject he has done so much to advance, and showed the active part taken by the walls of the capillaries in the circulation.

Professor J. B. Leathes was unfortunately prevented by grave illness from delivering the Croonian Lectures for 1923 on " The Rôle of Fats in vital Phenomena," and the College, on the advice of the Censors' Board, decided that these lectures should be published though not read.

The Bradshaw Lecture on " Angina, some points in prognosis," was given on 1 November, 1923, by Dr. John Hay and was based on a careful analysis of a large number of cases.

In the FitzPatrick Lectures delivered on 6 and 8 November, 1923, on " The History of Anatomy," Dr. Charles Singer gave a most interesting and well illustrated description of a subject on which he had thrown so much light.

The first Lloyd Roberts Lecturer was by the request of the two other participating bodies, the Medical Society of London and the Royal Society of Medicine, nominated by this College ; Mr. Edmund Gosse, C.B., LL.D., was accordingly appointed, and on 20 November, 1923, delivered the first lecture in the large Library before an audience of about 150 persons. The lecturer chose for his subject the " Personal Relations between Medicine and Literature," and, after briefly but graphically sketching the outlines of the benefactor's characteristics, proceeded to a charming review of some literary members of our profession up to the time of John Arbuthnot.

The Milroy lectures delivered on 11, 13, 18 March, 1924, by Lieut.-Colonel W. Glen Liston, C.I.E., I.M.S., on " Plague," dealt with its etiology and epidemiology

with an account of his investigations into the part played by rat-fleas in the transmission of the disease.

The Goulstonian lectures were given on 25, 27 March and 1 April, 1924, by Dr. L. G. Parsons on " Some Wasting Disorders of Early Life," and showed evidence of much careful chemical research into the dietetic factors responsible for these metabolic disturbances, as well as careful clinical observations, especially on pylorospasm.

The Lumleian lectures were delivered on 3, 8, 10 April, 1924, by Professor Thomas McCrae, of Philadelphia, who, in describing " The Clinical Features of Foreign Bodies in the Bronchi," shed a wealth of new light on the medical aspects of a subject which has hitherto received rather less than its due attention from general physicians.

MEDALS AND SCHOLARSHIPS.

The *Baly Medal* was awarded to Mr. J. Barcroft, F.R.S.

The *Bisset Hawkins Medal* to Dr. T. M. Legge, C.B.E.

The *Gilbert Blane Medal* to Surg. Lieut.-Commander J. L. Priston, R.N., a Member of the College.

The *Jenks Scholarship* to Mr. George Denison Stilwell.

GIFTS TO THE COLLEGE.

Sir Thomas Barlow made a most generous present of a thousand pounds to the funds of the College.

In addition to many valuable gifts to the Library, including an incunabulum *Artificiosa Memoria* by Petrus de Ravenna, 1491, from Dr. Herbert Spencer, the College has received from Dr. R. W. Innes Smith, a Licentiate, a portrait in oils of Sir Charles Scarburgh, Harvey's friend and successor in the Lumleian lectureship. The portrait had long been in the collection at Temple Newsome, Co. Yorks, and at its dispersal was described in the sale catalogue merely as that of " A Navigator," but Dr. Innes Smith recognized it from the engraving of a portrait of Scarburgh ascribed to Van der Gucht. By the kindness of Sir W. Orpen the College has obtained, at a comparatively small cost, a replica of his fine portrait of the late Dr. David Lloyd Roberts.

PERSONNEL OF THE COLLEGE; REPRESENTATION OF THE COLLEGE ON OTHER BODIES.

At the Quarterly Comitia on 26 April, 1923, a letter was received from Sir Dyce Duckworth, tendering his resignation (to take effect in July) of the office of Treasurer, an office which he had held with distinction and great advantage to the College for 39 years. His resignation was accepted with much regret, and with expressions of gratitude for the work so well and so long performed. It was resolved to appoint Sir Dyce as Emeritus Treasurer and as an additional member of the Finance Committee, and to vote him a sum of three hundred guineas, to be paid during the coming financial year. Dr. Sidney Phillips was appointed Treasurer.

William Fleming, Bedell (1892-1923), an old and faithful servant of the College, died quietly in his sleep on the night of 19-20 June, 1923, after having done his day's work as usual. His service to the College, of which he had a lover's complete knowledge, began more than fifty years ago. Born in 1854, his first connection with our College was as a porter in 1872. Later he became a clerk at the Examination Hall (1887-1892), and in May, 1892, returned as Bedell to succeed Mr. Gurney. He was a self-made scholar, and from his devotion to the College and its great men of old time had imbibed the courteous manners of a bygone age and an unfailing store of historical lore about our ancient Society. At the Quarterly Meeting of the College in July the following Resolution was passed:—

"That the College desires to place on record its deep regret at the death of Mr. William Fleming, and its appreciation of his faithful and valuable services over fifty years, during thirty years of which he held the office of Bedell, to the entire satisfaction of the Fellows and of all those with whom he was brought into contact."

Mr. Horace M. Barlow, who for 16 years has been Assistant Librarian, has been appointed Bedell. His knowledge of the Library, and of books generally, will still be available for the College. Mr. H. G. Eycott has been appointed Assistant Librarian, his duties to include such clerical

work as may be required of him by the College Officers, and his services are already proving valuable to the College.

A. C. Clauson, Esq., C.B.E., K.C., has been appointed Senior Standing Counsel to the College, vice Sir Thomas J. C. Tomlin, K.C., appointed Judge in the High Court of Justice.

Dr. J. A. Nixon was appointed the representative on the Court of the University of Bristol, in the place of Dr. Newton Pitt ; Dr. Arthur J. Hall, the Representative Governor of the University of Sheffield, in the place of Sir Humphry Rolleston ; and Dr. Edwin Goodall, the Representative on the Advisory Medical Board of the University of Wales, in succession to Sir Hector Mackenzie.

At the Official French Celebrations of the Centenary of the birth of Pasteur at Paris and Strassbourg from 24-30 May, 1923, the College was represented by Dr. H. Morley Fletcher.

The President represented the College at the Celebration of the 800th Anniversary on 5-9 June, 1923, of St. Bartholomew's Hospital and the Priory Church of St. Bartholomew the Great, and presented to the Prince of Wales, President of the Hospital, an address handsomely illustrated by Mr. F. G. Hallett.

Dr. (now Sir) Byrom Bramwell represented the College at the Centenary Celebrations of the Royal (Dick) Veterinary College, Edinburgh, in November, 1923.

FINANCE.

Conjoint Finance for 1923.—While the candidates for the Final Examinations have greatly increased in number, those for the earlier Examinations and for the special Diplomas have fallen off. Nevertheless, the net amount divisible between the two Colleges came to £23,096, an increase of over £6,000 on the previous year (1922). The capitation fee of the Examiners in Medicine has been raised from £3 15s. to £4 15s.

College Finance—Dr. Sidney Phillips, since his appointment as Treasurer, has been engaged in readjusting the monetary arrangements of the various Trust funds. The new scheme for the Sadlier Trust (Croonian Lectures) has received the final approval of the College and of the

Charity Commission ; the most important point is that the scheme enables any future surplus of this Trust to be expended in augmentation of the income of other lectureships. The payment for some of the lectures, notably the Goulstonian, has hitherto been made up by the College, but this can now be rectified.

One of the rent-charges under the Lumleian Trust, that on property in Repton, has been commuted and the proceeds invested. The vexed question of the Anslow rent-charge under the same Trust is still unsettled.

There are two subjects which may bear on the finance of the future :—

1. The College has expressed its willingness to take a share in the restoration of the tower of the church at Hempstead, in Essex, which contains the tomb of William Harvey. A Committee is being formed to collect a fund for the restoration of the tower, on which many influential Essex residents, headed by the Bishop of Chelmsford and the Bishop of Colchester, have consented to serve. Representatives of the College and of other medical bodies will also be included.

2. The question of increasing the accommodation within the College was considered last year, and plans and estimates for this object were obtained from Sir Aston Webb, P.R.A. A committee was appointed at the Quarterly Comitia in July to consider this question. But the outlook was soon altered by the fact that the Canadian Government, after purchasing the lease of our neighbours, the Union Club, applied to the College, through Sir Howard Frank, of the firm of Messrs. Knight, Frank & Rutley, to ascertain if they could also acquire the site and buildings of our College. The question was carefully considered by the Committee and on their recommendation the Comitia of 26 March, 1924, passed a resolution declining to accede to the proposals.

COMMITTEE OF MANAGEMENT.

Examinations for the Licence and Conjoint Special Diplomas.—The number of candidates for the Final Examinations continues to increase. The normal number of Examiners in Medicine is ten, working in five pairs, of

whom one pair used, in past years, to "stand out" at each quarterly Examination, the remaining four pairs being enough to carry out the Examination. Now, however, all five pairs have to be at work. Even so, the Examinations have not always been completed by the date of the Quarterly Comitia, so that the President has from time to time been empowered to sign and seal the Diplomas of such candidates as complete their Examinations after that date. The Secretary, Mr. F. G. Hallett, considers that it may be necessary during the next two or three Examinations to ask for another (sixth) pair of Examiners, but that after that time the number of candidates will decline.

On the advice of the Committee, the Colleges have resolved to grant a Conjoint Diploma in the subject of Throat, Nose, and Ear Disease, to be called the Diploma in Laryngology and Otology (D.L.O.). Regulations have been drawn up, and one examination has been held.

A revised Syllabus of subjects included in the Materia Medica and Pharmacology Examination has been issued.

The new Regulations concerning the curriculum and Examinations for the Licence have now been embodied in our Bye-Laws. This is the only alteration in the Bye-Laws made since the last Presidential Address.

As to the new Rules for the Diploma of Public Health, made by the General Medical Council, certain modifications (as mentioned in the last Presidential Address) were strongly urged by the Colleges, in the interest of those practising abroad or attached to the Forces. It is much to be regretted that the Council has not adopted them.

It is hoped that the difficulties concerning the recognition of the Welsh National School of Medicine (mentioned in the same Address) are now on the way to settlement. Improvements in the requirements for the teaching of Medicine have been undertaken ; recognition of the School has been extended till October, 1924 ; and, subject to certain conditions, recognition may then become permanent.

The Examiners in Medicine sent to the Committee a letter, which was forwarded to the College, stating that many candidates were deplorably ignorant of the physical signs of disease. Several causes were suggested for this deficiency when the subject was discussed at the College. The letter was then referred to the Deans of the Medical Schools for their opinion, but so far a few only have replied.

Mr. H. J. Waring visited the Cairo School of Medicine at the end of 1922, and presented a valuable Report to the Committee. The College passed a vote of thanks to him for his services. In connection with this Report the Committee (1) obtained leave from the College to make certain suggestions to the Egyptian Minister of Education, (2) urged the College to insist that English should be used in all courses and Examinations, and not Arabic only.

CENSORS' BOARD.

Membership Examinations.—The numbers were as follows :—

	Admitted.	Withdrew before the Exam.	Referred.	Approved and admitted as Members.
1923.				
April ..	28	1	13	14
July ..	27	1	9	17
October	16	1	8	7
1924.				
January	23	—	9	14
	94	3	39	52 or 55·3 per cent

Removal or Restoration of Diplomas.—No cases were reported to the Board of such a nature as to render the withdrawal of a Diploma necessary, or calling for any kind of disciplinary measures. Two Diplomas of Licence, previously withdrawn by the College, have been restored

at the advice of the Censors' Board. The Membership has been restored to seven practitioners, who had previously resigned it in consequence of their having entered into partnership, or having taken a dispensing practice.

Some questions of importance have been discussed at the Board, which may come before the College later.

THE LIBRARY.

The repair of the books has been continued throughout the year. Special attention may be directed to the completion of the " Catalogue of the Legal Documents " in the possession of the College ; of the three copies made one has been accepted by the British Museum. A new and complete catalogue of the engraved portraits in the possession of the College is in process of formation and will soon be ready. As the College Library has never had a bookplate, steps are being taken to provide one worthy of its contents. During the year facilities have again been given to several Societies to inspect the Library and its contents. On these occasions an account of the history of the College and its Library has been given, and the various objects of interest have been shown and described by the Harveian Librarian.

Obituary Notices.*

During this Presidential year there have been 12, or 3 per cent., deaths among the Fellows. The average age of the deceased Fellows was 70 years. The oldest, Dr. P. W. Latham (91), and the youngest, Dr. P. W. Saunders (46), died within three days of each other. The year was noticeable for the death of a father and son.

Name.	*Date of Death.*	*Age.*
	1923.	
Arthur Carlyle Latham	13 April	55
Sir James Reid	28 June	73
George Edward Rennie	10 August	62
Peter Wallwork Latham	29 October	91
Percy Whittington Saunders	1 November	46
David White Finlay	4 November	83
Thomas Henry Green	5 November	81
Lauriston Elgie Shaw	25 December	64
	1924.	
Thomas William Thursfield	14 January	84
Donald William Charles Hood	15 March	76
William Alfred Wills	2 April	61
Alexander Haig	6 April	71

ARTHUR CARLYLE LATHAM.

Arthur Carlyle Latham, who died on Friday, 13 April, 1923, after nine months' illness, was born on 1 December, 1867, at Cambridge, and was the last surviving son of our late senior Fellow, P. W. Latham, and Jemima McDiamid of Dumfries ; he thus inherited Lancastrian persistence and Scottish sturdiness. Educated at Fettes College and for a year, 1886, at the University of Edinburgh, he proceeded in 1887 to Balliol College, Oxford, where he obtained a first class in the Natural Science Final Schools in 1892, and gained a Radcliffe Travelling Fellowship (1895). He was also a member of King's College, Cambridge (incorporated B.A. 1890), and thus had experience

* Dr. Hugh Walsham died on 13 April, but notification was received too late for the inclusion of his obituary. This will appear in the next Presidential Address.

of two most scholarly Colleges of the older Universities. At St. George's Hospital he was elected assistant physician in 1898, became full physician in 1905, and was active as Dean of the Medical School (1902-4). He was also for a time (1897-1900) assistant physician to the Victoria Hospital for Children, and acted as advisory physician to the Hospital for Diseases of the Throat, Golden Square, and to the Lying-in Hospital, York Road. Comparatively early in his professional career he directed his energies to the study of tuberculosis ; in May, 1899, he gained one of the Research scholarships of the Grocers' Company and investigated "The commencement of tuberculosis in children, with special reference to the localities of the body primarily invaded by the disease and the sequence in which the various organs are attacked." In 1900 he was appointed assistant physician to the Brompton Hospital for Consumption and Diseases of the Chest, and after he resigned this post in 1909 was elected physician to the Mount Vernon Hospital for Tuberculosis and Diseases of the Lungs and Heart (1910-1913). In 1902, in association with A. William West, architect, he gained the first prize (£500) for an essay on the erection of the King Edward VIIth Sanatorium for Tuberculosis at Midhurst, for which 180 essays were sent in ; this essay was published by Baillière, Tindall and Cox in the following year and so came out at the same time as his book on *The Early Diagnosis and Modern Treatment of Consumption,* which passed into a fourth edition. He also wrote a *Dictionary of Medical Treatment* (1908), which is in its second edition, a work on *Medical Diagnosis* (1915, with J. A. Torrens), was joint editor of a *System of Treatment* in four volumes (1912, with Sir Crisp English), and, shortly after he was Radcliffe Travelling Fellow, translated, with his father, Binz's *Lectures on Pharmacology* (New Sydenham Society) and von Limbeck's *Pathology of the Blood.*

Apart from purely professional work, Arthur Latham's name will remain as one of those largely responsible for the successful amalgamation of various medical societies into the Royal Society of Medicine. This scheme, originated in 1893 by Mr. (now Sir John) MacAlister, was approved by Sir Andrew Clark, then President both of this College and of the Royal Medical

and Chirurgical Society, but his death on the day convened for the discussion of the project put a stop to any progress, and it was not until 1905 that the matter was brought up again by Sir Richard Douglas Powell, President, and Sir John MacAlister, Secretary, of the premier Medical Society. At a meeting held in the College on 10 April, 1905, with the President, Sir William Church, in the chair, an organising committee, with Latham and his surgical colleague and friend, H. S. Pendlebury, as Honorary Secretaries, was appointed. The necessary negotiations with the various medical societies extended over two years and demanded an enormous expenditure of time, patience, and conciliatory tact to overcome the difficulties of the numerous and complicated problems. But on 14 June, 1907, the final seal of success was put on the scheme by a supplementary Charter from the Crown, and for the next five years Latham remained as Honorary Secretary of the Royal Society of Medicine. Possessed of a logical and able brain, remarkable organising powers and initiative, Latham took an active part in many movements, and was a hard though rapid worker. A clear, courageous and convincing speaker, with a vein of caustic criticism at his command, he would undoubtedly have been as successful at the bar as he was in our profession. One of his oldest friends writes, "A man of force and of originality of outlook, he will be overvalued by some and greatly undervalued by others." Unfortunately, he was much handicapped throughout his professional life, and especially in recent years, by ill health. He became a Member in 1898 and a Fellow of the College in 1904.

JAMES REID.

The death of Sir James Reid on 28 June, 1923, after an illness of five weeks, removed a sterling character, whose position as the personal attendant of Queen Victoria was unique, at any rate in modern times, both from his office and what he made of it; he was, indeed, an eminent Victorian.

Born on 23 October, 1849, he was the eldest son of James Reid (1819-1883), of Ellon, Aberdeenshire, one

of the Reids of Muirton, and of Beatrice Peter, of Canterland, a descendant of the Scottish Barclay family of which John Barclay (1582-1621), the satirist author of "Argenis" and "Satyricon," in the style of Petronius, was a member. Reid, who owed something to his mother's heredity and certainly much to her influence, had a distinguished career as a student, for he was Dux and Gold Medallist at the Aberdeen Grammar School in 1865, and at the University of Aberdeen graduated M.A. with honours and a gold medal in 1869, M.B., C.M. with highest honours in 1872, and M.D. three years later. After graduation, he started practice in London in Upper Westbourne Terrace, but abandoned this in 1875, and, after spending two years in post-graduate study in Vienna, joined his father in practice at Ellon in 1877. On the death of Dr. William Marshall in 1881, he became, at the age of thirty-two, resident physician to the late Queen Victoria, and in the following twenty years "acquired probably to a greater degree than any of her subjects a personal knowledge of her Majesty." He became physician extraordinary in 1887, physician-in-ordinary and C.B. in 1889, K.C.B. in 1895, a Baronet on the occasion of the Diamond Jubilee in 1887, and a G.C.V.O. in 1901, after Queen Victoria's death. He was physician-in-ordinary to King Edward VII and King George V, and received many foreign orders when visiting the Courts of Europe with King Edward. The Supplement to *The London Gazette* of 19 June, 1911, contained among the Coronation Honours—"The King has been pleased by Warrant under His Majesty's Royal Sign Manual, bearing date the 14th instant, to give and grant unto Sir James Reid, Baronet, G.C.V.O., K.C.B., one of His Majesty's Physicians-in-Ordinary, Physician-in-Ordinary to His late Majesty King Edward the Seventh and to Her late Majesty Queen Victoria, in consideration of services rendered to His Majesty's dearly beloved father, Royal Licence and Authority, that he, the said Sir James Reid, and his descendants, may bear to his and their Armorial Ensigns the Honourable Augmentation following, that is to say: On a chief Gules a Lion passant guardant Or armed and langued Azure (being one of the Lions from the Royal Arms): Provided the said Honourable Augmentation be first duly exemplified according to the Laws of Arms and recorded in the College of Arms."

After the death of Queen Victoria, Reid settled in London in the house, 72, Grosvenor Street, previously occupied successively by Sir Samuel Wilks and Sir James Ranald Martin. Thus, entering medical life in London at the age of fifty-two, the became known rather to the senior Fellows than to the College as a whole, for, though a very clubbable man, as Dr. Samuel Johnson said of James Boswell, his essentially modest nature did not make him a constant attendant at the ordinary meetings of medical societies. He became a Member in 1887, a Fellow in 1892, and served on the Council of the College (1910-12) and the Finance Committee (1912-15). The Universities of Glasgow and Aberdeen conferred on him the Honorary LL.D., the Royal University of Ireland made him an Honorary M.D., and the Royal College of Physicians of Ireland elected him an Honorary Fellow.

Reid was a most kindly man, but this did not prevent one with his straightforward and independent character from fearlessly expressing his opinions when necessity called him to denounce what he thought wrong. The soul of honour, he had a contempt for intrigue and self seeking, and inspired not only sincere respect but affection in those that had the privilege of knowing this honest and honourable man.

GEORGE EDWARD RENNIE.

George Edward Rennie's death on 10 August, 1923, in his native city, Sydney, deprived Australia of a scholarly, public spirited and unostentatious consulting physician.

He was born in Sydney on 10 September, 1861, of a distinguished family, for his father, Edward A. Rennie, was Auditor-General of New South Wales, and an elder brother, Edward Henry, has since 1885 been Professor of Chemistry in the University of Adelaide. A brilliant schoolboy and winner of many prizes and scholarships at the University of Sydney, he took his degree in Arts in 1882 with first-class honours in Greek and Latin and in Natural Science. In that year he came to London and entered the Medical School of University College Hospital, where his career ran on the same lines until in 1888 he obtained the Gold Medal in the M.D. London, the first time that this honour had been carried off by an

Australian. In 1889 he returned to Sydney, and after serving as assistant pathologist was appointed assistant physician to the Royal Prince Alfred Hospital, becoming full physician in 1898 ; he thus became actively engaged in hospital and private practice and was specially interested in neurology. He then visited London again, worked at the National Hospital for the Paralysed and Epileptic, Queen Square, and in 1899 was admitted to our Membership, being elected a Fellow in 1907. On his return to Sydney he again served as assistant physician for six years at the Royal Prince Alfred Hospital, becoming full physician in 1906, senior physician six years later, and retiring in 1921 on attaining the age limit of sixty years, when he was elected consulting physician. Combining the mental attitude of the physician with the experience of a pathologist and a physiologist, he was an inspiring teacher, and for some years lectured on Medicine in the University of Sydney. His wide interest in nervous disorders was shown by his fourteen years of admirable work as visiting physician to a mental hospital where the inmates were not certified and therefore could not be detained against their will. Although much occupied in other ways, he edited the *Australian Medical Gazette* from 1901 to 1914, and played an active part in the Medical Societies to the last ; he was to have given an address in July, 1923, on glycosuria and diabetes, but was struck down before the meeting with the cerebral thrombosis from which he eventually died. His later years were saddened by the loss of two sons in the Great War. A man of high ideals and unselfish and retiring character, he was a fine example to the Dominions of a Fellow of this College.

PETER WALLWORK LATHAM.

The Senior Fellow of the College, Peter Wallwork Latham, followed his son, Arthur Latham, into the valley of the shadow on 29 October, 1923, a little more than a week after his ninety-first birthday.

He was born on 21 October, 1832, at Wigan as the eldest son of John Latham, a medical man in that town, but was not related to the famous physicians, John and Peter Mere Latham. After serving as apprentice to his father,

he continued his medical education at Glasgow, and in 1854 passed to Caius College, Cambridge, where he gained a scholarship in the following year; in 1858 he went out as nineteenth Wrangler in the mathematical tripos, and in 1859 was placed first in the first class of the natural sciences tripos with distinction in no less than five subjects—chemistry, physiology, physics, comparative anatomy, and botany—a record that has never been equalled. His only companion in the first class was the Rev. George Henslowe, formerly lecturer on botany at St. Bartholomew's Hospital (1866-1890), who is still living. After working at St. Bartholomew's Hospital, London, he was in 1860 elected a Fellow of Downing College, Cambridge, and in April, 1862, the year of his first marriage, assistant physician to the Westminster Hospital. This post, however, he resigned in June, 1863, on being appointed physician to Addenbrooke's Hospital and medical lecturer at Downing. In the following year he proceeded to the M.D. with a thesis *On the early symptoms of phthisis and the means best adapted to prevent or arrest its development*, which was published in booklet form. He devoted much time and ability to drafting new statutes for the College founded by Sir George Downing, and thus helped to raise it from the state of deep depression into which it had sunk. From 1868 he acted as deputy for W. W. Fisher, the Downing Professor of Medicine, then in his seventieth year, until in 1874 he was elected as his successor. This chair he held, as he had declared he would do, for twenty years and no longer, but he remained physician to Addenbrooke's Hospital until 1899, and did not leave Cambridge until 1912; he then settled in London, where, though handicapped by increasing deafness, he enjoyed seeing his friends until sorely stricken by the grave illness and the death of his surviving son, Arthur, our late Fellow; he then moved, in May, 1923, to Clifton, Bristol, into a flat next door to the house in which his second wife spent her childhood. One of our Fellows in Clifton who looked after his closing days urged him to write his reminiscences of medical education, but he could not bring his mind away from his son's death, which really killed him. Latham lived in Cambridge for sixty years and so saw the rise of the Medical School under the stimulating influence

of Sir George Humphry and Sir Michael Foster, but, looking at medicine from rather a different angle and with equally firm opinions, he did not walk hand in hand with these pioneers. Fearless in debate, he seemed rather to enjoy than to avoid the clash of intellectual contest. As a sound general physician, he had an extensive practice for many years, and his genial personality inspired confidence. At one time he was much attracted by the chemical theories in medicine, somewhat recalling Bence Jones in an earlier period ; this was shown in his Croonian lectures (1886) *On some points in the pathology of rheumatism, gout and diabetes,* which contained some elaborate formulæ and were considered to have impressed the College authorities in no small degree ; two years later he gave the Harveian Oration on micro-organisms and blood infections. Previously he had published two lectures, illustrated by Airy's spectra, on *Nervous or Sick-headache* (1873), and contributed the article on this subject to Quain's *Dictionary of Medicine.* No large work came from his active brain, but he wrote in the medical journals on various subjects, such as the pathology and treatment of typhoid fever (with Arthur Latham, 1893) and the treatment of rheumatoid arthritis by continuous counter-irritation of the spine by blisters (1905), and, together with his son, brought out the English translation of Carl Binz's *Lectures on Pharmacology* in the New Sydenham Society (1895-1897).

In the College he held more offices than any country Fellow has ever done, for not only was he Councillor (1886) and Censor (1887-1888), but Senior Censor (1894), a striking proof of the opinion of his contemporaries.

PERCY WHITTINGTON SAUNDERS.

The College lost by the premature death on 1 November, 1923, one of its recent Fellows, Percy Whittington Saunders, from a rare form of sarcoma of the lymphatic glands, after some years of ill-health, which for the last six months had laid him completely aside. Overwork during the War, the loss of a combatant brother at the front, and influenza had undermined his powers of resistance. He was the eldest of the three sons of Edward Saunders, the manager of the Canadian Landed and National

Investment Company, and was born at Toronto on 31 May, 1877, where he took the B.A. in 1898 and M.B. (Gold Medal) in 1902. Coming to this country as a lonely stranger, he first worked at the London Hospital, and after taking the Conjoint Board Diploma in 1905 and holding resident appointments at the East London Hospital for Sick Children, Shadwell, and at the City of London Hospital for Diseases of the Chest, was house physician, resident medical officer, registrar, and finally assistant physician at the National Hospital, Queen Square. In 1913 he was elected assistant physician to the Royal Free Hospital and lecturer on medical pathology in the London School of Medicine for Women, becoming full physician in 1922 ; in the meanwhile he had taken our Membership in 1909 and had been elected a Fellow in 1917. A most conscientious and extremely hard worker, he was an admirable teacher, no trouble being too great if he could thereby help his pupils. Though far from a copious writer, he had established a reputation by articles in *Brain*, the *Oxford System of Medicine* (Christian and Mackenzie), the *Encyclopædia Medica*, and elsewhere. Outside his professional work he had wide interests in literature and a genuine love for classical learning. Of a retiring disposition, he was not widely known, but those thus privileged regret the loss of a high-minded and unselfish friend.

DAVID WHITE FINLAY.

David White Finlay, who died on 4 November, 1923, was born in Glasgow on 1 September, 1840, as the son of a merchant, James Finlay ; his family was not connected with that of the ex-Lord Chancellor, Lord Finlay of Nairn, who forsook medicine for law. Educated at the High School and University of his native city, Finlay graduated B.A. in 1860 and M.D., C.M. (with commendation) four years later, and then travelled abroad for his health, visiting South America and devoting much time to yachting. He appears to have abandoned medicine for some years ; at any rate, it was only in 1872 that, after a post-graduate course at Vienna, he came to London and obtained a resident post at the Stone (now St. Peter's) Hospital. Early in 1874 he became resident physician's

assistant for one and a half years at the Middlesex Hospital, where, being some ten years older than his colleagues, he was affectionately known as "the Skipper." After this he was in due course medical registrar (1876-79), assistant physician (1879-1884), and physician (1884-1891); in the Medical School he lectured on forensic medicine (1881-1891) and practical medicine (1884-1891), and in connection with the first of these posts took the D.P.H., Cambridge, in 1883. He was also physician (1876-1891) and consulting physician to the Royal Chest Hospital, City Road, which in 1921 was amalgamated with the Royal Northern Hospital and a Scottish institution for the sick poor. He became a Member in 1876, a Fellow in 1885, and served on the Council of the College (1908-1910).

In 1891, after a keen contest, he was appointed Regius Professor of the Practice of Medicine in the University of Aberdeen to succeed Professor J. W. F. Smith-Shand, and became physician to the Aberdeen Infirmary. In 1907 he succeeded Professor R. Reid as Dean of the Faculty of Medicine, and for the ten years, 1901-1911, represented the University on the General Medical Council, for which he had acted as Inspector of Examinations (1887-1890). In 1908 His late Majesty Edward VII made him one of his honorary physicians in Scotland, and this distinction was continued in 1911 by King George V. In 1900 he attended the bicentenary celebrations at Yale, and was made an honorary LL.D. On his retirement in 1912 he became Emeritus Professor and subsequently received the Hon. LL.D of Aberdeen. The remainder of his life was spent at Helensburgh on the Clyde, in the neighbourhood of his birth-place, with its opportunities for his favourite recreations of photography and yachting; some of his experiences before this time are to be found in his *Reminiscences of Yacht-racing and some Racing Yachts* (1910). But with the onset of the War he returned to work and was Commandant, as temporary Lieut.-Colonel R.A.M.C., of the Scottish National Red Cross Hospital at Bellahouston, and was Examiner in Medicine at the University of Glasgow (1913-17 and June, 1919).

With a high reputation as a physician and a teacher of physicians he set a fine example of accurate observation,

attention to detail, and conscientious punctuality. Quiet and reserved, but not without flashes of Scottish humour, he employed the Socratic method in teaching his students, in whom he always took a keen interest. He contributed a number of articles, especially on thoracic disease, such as pneumothorax, but no book to medical literature. With a broad-minded interest in human welfare he was a strong advocate of temperance, without being a prohibitionist, and originated the Hogmanay Café in Aberdeen as a Christmas rival to the public houses and whiskey.

THOMAS HENRY GREEN.

On 5 November, 1923, Thomas Henry Green died at the Moorings, St. Albans, where he had lived in retirement since the autumn of 1910. He was born on 21 October, 1842, at Saffron Walden, and was the son of Thomas Day Green of that town, a member of the Society of Friends. After education at a school belonging to that denomination he entered University College Hospital, becoming M.R.C.S. in 1864, M.B. with first class honours in medicine in 1865, and M.D. London in 1866. After holding various resident posts at his own hospital and that of medical registrar at the Great Ormond Street Hospital for Sick Children, he was in 1868 elected assistant physician to Charing Cross Hospital, which he loyally served as an active member of the staff for 35 years, being physician for no less than 28 years (1874-1902). At the Brompton Hospital for Consumption and Diseases of the Chest he was assistant physician (1875) and physician (1888-1903), being elected to the junior post on the same day as his colleague at Charing Cross, Dr. J. Mitchell Bruce. Modelled on his own chief, Sir William Jenner, he was one of the best clinical teachers in London—clear, concise, dogmatic and practical; his memory is, therefore, held in grateful remembrance by many generations of his students who, it is said, found it quite unnecessary to read text-books provided they followed him in the wards. In spite of this he was mainly known outside his hospital, like a former President of this College, Sir Samuel Wilks, for his text-book on pathology. When he joined Charing

Cross Hospital he was fresh from Virchow's teaching and most appropriately lectured on that subject for twenty years. "Green's Pathology" first appeared in 1871 as a volume of 304 pages and he continued to edit it as long as he held the lectureship, then entrusting it to his successors and colleagues, the last and thirteenth edition in its forty-third year in 1923 being much expanded in the size of the page, more than double the number and with almost exactly four times the number of illustrations; it was twice—in 1876 and 1886—translated into Japanese. As not very rarely happens, a prolonged apprenticeship to pathology, while providing the most invaluable basis for accurate diagnosis, appeared by some perversity of reasoning to detract from Green's attractiveness in popular esteem as a consulting physician. Apart from his standard text-book he was not a prolific writer; in 1876 his lectures at the Brompton Hospital *On the Pathology of Pulmonary Consumption* were published in book form, and dealt with the then much debated nature of tubercle. In the life of London Medical Societies he took a full share, being Secretary (1875-6) and Vice-President (1886-8) of the old Pathological Society of London, on the Council of and contributor of four papers to the Clinical Society, on the Council (1886), referee for papers (1882-1906) and Vice-President (1906) of the Royal Medico-Chirurgical Society, and one of the first Vice-Presidents of the Medical Section of the Royal Society of Medicine (1907). At our College he became a Member in 1867, a Fellow in 1874, and was Censor (1900-1), Senior Censor (1904), Councillor, and for eight years an Examiner.

Green was thus a fine representative of the best type of contemporary hospital physician, but his retiring temperament with a reserved, rather distant and formal manner, possibly the outcome of his Quaker upbringing, though in early manhood he joined the Church of England, prevented him from ever being much in evidence, and he was not one of the "three G.s" (Greenfield, Gowers, and Goodhart), all distinguished Fellows of this College, who were prominent figures in Medical Societies some forty-five years ago. With high ideals, he was content to do the day's work without any aim further than to have maintained his own self-respect.

LAURISTON ELGIE SHAW.

After a long and intermittently successful struggle, extending over more than forty years, against pulmonary tuberculosis, Lauriston Elgie Shaw passed behind the veil on Christmas Day, 1923, at Weybridge, where he had lived for the last three years. He was born in London on 31 March, 1859, of a medical family, for his father, Archibald Shaw, practised in St. Leonards and his brother, Mr. C. T. Knox-Shaw, was Ophthalmic Surgeon to the London Homœopathic Hospital.

After early education at the City of London School and at University College, he entered the Medical School of Guy's Hospital on 1 October, 1877, qualifying in 1881 M.R.C.S., and taking the M.B. (1882) and M.D. (1883) of London University. An attack of hæmoptysis then made him take the post of ship's surgeon on a sailing vessel to Australia ; on his return to London he took the Membership of our College in 1885 and began to climb the ladder of the medical staff of his old hospital, being successively demonstrator of biology (1885), medical registrar (1887), assistant physician in 1889, when he was appointed demonstrator of morbid anatomy and curator of the museum, Dean of the Medical and Dental Schools (1893-1901), physician (1907), and consulting physician (1919).

Although a sound clinician and popular teacher, Shaw's career and tastes were rather different from those of the ordinary hospital physician ; his energies were not so much confined to the science and practice of medicine as extended to those broader and less detailed aspects often dismissed, by those who have no taste in that direction, as medical politics, and to the organisation of schemes for improving the national health. His high ideals and unselfish disposition led him into activities attended by discussions on lines often more electric than philosophic ; but however much his opponents might disagree with his views, his disinterestedness, moral courage and anxiety to further the public good were always recognised and respected. There was, indeed, a contrast between the affection his personality attracted and the criticism that his opinions, always put forward persuasively, with good temper, and usually with humour, might excite. As his colleague, Dr. J. Fawcett, wrote, " To know him was to love him ; to be his friend was a

great privilege." For a time he was a prominent figure at the British Medical Association, being President of the Metropolitan Counties Branch in 1911 and Chairman of the Central Ethical Committee. But his active part in framing the National Health Insurance Act on "the guiding principles of his medico-legal life" and in furthering its aims raised such antagonism among the rank and file of the profession that for a time he felt that nearly every avenue of activity was closed to him. His services as Treasurer of the London Panel Committee from its start were recognised by a presentation to him in 1922 when his desire to resign for reasons of health was overruled. In 1916 he became manager of the Metropolitan Asylums Board and was chairman of the Pinewood Sanatorium Sub-committee. Shaw was elected a Fellow in 1892, was an examiner in Medicine (1911-14) and on the Council in 1922.

THOMAS WILLIAM THURSFIELD.

By the death, after an operation, of Thomas William Thursfield on 14 January, 1924, Leamington lost a most public-spirited Freeman, a former Mayor (1894-97), and for forty-two years the Chairman of its Public Library and Museum Committee. Born at Kidderminster on 23 September, 1839, he came of a medical family and followed in the professional footsteps of his father, Thomas Thursfield, his paternal grandfather, and great-grandfather. His younger brother, Sir James, who died a year earlier, was Fellow, Aristotelian lecturer, and honorary Fellow of Jesus College, Oxford, and for many years was one of the band of Oxford leader-writers on *The Times*, being more specially know as its naval critic.

After education at the ancient Grammar School of his native town, Thursfield proceeded through Lancing and King's College, London, to the University of Aberdeen in 1856, where he passed the examination for the M.D. degree before his twenty-first birthday ; having therefore to wait until 25 September, 1860, for his diploma, he became the first graduate in any faculty of the new University of Aberdeen, which had been constituted on 8 September previously by the incorporation of King's and Marischal Colleges into one University and College. His name will be kept in recollection at his University

by his bequest of £450 to endow a Gold Medal (or other award) for the best thesis for the M.D. degree. Shortly after entering the University in 1856 he lost his father, and accordingly had the stimulus of a lean purse, which in later years he praised as an advantage. After working in London and Paris, and after travelling abroad for some years, in several instances with patients, he settled down in 1865 to general practice, first for a year in Kidderminster and then in Leamington. About 1880 he gave up general practice, and in 1882 was elected honorary physician to the Warneford Hospital, becoming Consulting Physician twenty-nine years later. For the hospital he raised some £16,000, and his services in this and in his professional capacity were rightly recognised by a presentation portrait ; it was said of him that " no work in his life was so near his heart as the Warneford Hospital." In addition, he founded in 1869 the Provident Dispensary and was its trustee until 1911, when ill-health overtook him.

Though a successful consultant, Dr. Thursfield contributed very little to medical literature, partly because what spare time he had was much occupied by his conspicuous services to the medical charities and municipality of Leamington, for he was a prominent promoter of every branch of the public weal. Cultured in many directions, fond of travel, eloquent and impressive as a speaker, he was well-read and gave local addresses of historical and biographical interest ; though without any claims to be a Scotsman, save his Aberdeen degree and the Membership of the Royal College of Physicians of Edinburgh taken in 1880, he had the unique distinction, which he valued highly, of being President of the local Burns Club. A keen politician, he belonged to the Liberal and subsequently to the Liberal-Unionist party, and in his early days was known as " the Radical Doctor," thus recalling his friend and neighbour, " the Radical Parson," the Rev. William Tuckwell, sometime Vicar of Stockton, Warwickshire, and brother of a former distinguished Fellow of this College well-known to the older generation of Oxford medical graduates. Thursfield became a Member of our College in 1881 and a Fellow in 1890, and was a worthy exponent in the provinces of the best traditions of an all-round physician.

DONALD WILLIAM CHARLES HOOD.

Donald William Charles Hood, who died on 15 March, 1924, from the effects of influenza, was the eldest son of the late Sir William Charles Hood, M.D., F.R.C.P., Lord Chancellor's Visitor in Lunacy, and was born at Market Lavington, Wilts, on 23 June, 1847. After passing through Harrow and Caius College, Cambridge, he entered the Medical School of Guy's Hospital in May, 1865, and qualified in July, 1869, at the Royal College of Surgeons, taking the M.B. Cambridge in 1871. He proceeded to the M.D. degree in 1879, in which year he became a Member of this College and began his long and active association with the West London Hospital as assistant physician, becoming physician in 1883, consulting physician on his retirement in 1909, and Vice-President in 1910. He was elected a Fellow of this College in 1892, and served on the Council (1910-12) and on the Finance Committee (1913-15).

During the ten years after qualification he practised for a time in the country, and, indeed, throughout life retained the pleasant air of a country squire and a keen sportsman, so that until the last year or so, when he had a very severe illness, his looks were much younger than his years. His interests were wide, for besides devoting much time to the successful post-graduate school at the West London Hospital, of which he was one of the founders, and to the West London Medico-Chirurgical Society, of which he was President in 1893-4, he was consulting physician and on the Board of Management of the Earlswood Royal Institution, Governor and on the Board of Management of Bethlem and Bridewell Hospitals, of which his father had been treasurer, examining physician to the Foreign Office, and a Manager of the Royal Institution. He received the C.V.O. in 1891 in recognition of his services in London to wounded and sick officers returning from the South African War.

A shrewd, sound and successful physician and a good clinical observer, he was a popular teacher of post-graduates. He wrote comparatively little, but what he did was based on practical experience, such as his contributions on pneumonia. Although not attached to an undergraduate teaching school, his attainments were recognised by his appointment as an examiner in Medicine at his own University.

WILLIAM ALFRED WILLS.

The death on 2 April of William Alfred Wills, at his home, Rotherhill, near Midhurst, occurred after some months of disability and a longer period of impaired health, against which he had courageously fought and meanwhile continued to do most useful public work in the district around Midhurst, where he had lived since his retirement from London in 1905. During these seventeen years he cheerfully and unostentatiously devoted himself to the public weal ; as a Justice of the Peace, a County Councillor for West Sussex, Secretary of the Emergency Committee for the Midhurst District during the War, as visitor to Asylums, and in many other ways he earned the respect and affection of the countryside.

Born in October, 1862, he was the eldest child of the second family of the late Hon. Mr. Justice Wills ; his mother was Bertha, the daughter of T. L. Taylor. Educated at Fettes and University College, London, he was at first anxious to become an engineer, but, acting on his father's advice, he decided in favour of medicine, and about 1880 entered the school of Westminster Hospital, with which he remained connected during his professional life. Qualifying at the College of Surgeons in 1884, he took the M.B. (1885) and M.D. (1890) London, the Membership in 1891, and was elected a Fellow of the College in 1902. After serving as medical registrar of Westminster Hospital (1888-1893), he was elected assistant physician in June, 1893, and lectured on forensic medicine in the School until May, 1905, when ill-health obliged him to retire just before he would have succeeded to the post of physician to the Hospital. In the meanwhile he was on the staff of the North Eastern Hospital for Children and was elected consulting physician on his retirement.

During his comparatively short professional life Wills made a number of contributions to medical literature, especially to the *Westminster Hospital Reports*, such as " On the Application to Medical Uses of the Electric Lighting Current " (1893, viii, 49), " Some Suggestions on the Influence of Sex in the Production of Anæmia " (1897, x, 45), and " Infant Feeding " (1899, xi, 59). In collaboration with his brother-in-law, Sir Wilmot Herringham, he published a valuable experimental research on " The Elasticity of the Aorta, a contribution to the study

of Arterial Sclerosis" (*Med.-Chir. Trans.*, 1904, lxxxvii, 489-527), a subject for which his knowledge of physical problems specially fitted him. He also contributed the article on "Diseases of the Mouth" to the first edition of Sir Clifford Allbutt's *System of Medicine* (1897).

Wills was a man of many interests; in addition to his country occupations, he was, like his father, who was one of the founders and the third President of the Alpine Club (1864), a keen climber, being Secretary of the Alpine Club (1897-1900) and on its Council (1895). The family châlet, "The Eagle's Nest," high above Sixt, in Savoie, was familiar to many of his friends as a happy holiday home. With this special knowledge he was appropriately chosen to write on "Mountain Sickness" in Quain's *Dictionary of Medicine* (1901).

ALEXANDER HAIG.

Alexander Haig, the only son of George Andrew Haig of Maulesden, Brechin, and with his cousin, Earl Haig, in the 24th generation of the Haigs of Bemersyde, was born at Blairhill, Rumbling Bridge, Perthshire, on 19 January, 1853, as a seven months infant; that poor health persisted from childhood into adult life was obvious from his appearance. After being at Glenalmond and Harrow, he went up in 1872 to Exeter College, Oxford, where in 1876 he was placed in the second class of the Natural Science School, taking physiology as his subject, and might well have got a first had he not been severely handicapped by inability to use his eyes for reading for six weeks before the examination. Entering the Medical School of St. Bartholomew's Hospital in the same year, he qualified M.R.C.S. in 1879, and became B.M. (1880) and D.M. (1888) Oxford, a Member (1883) and a Fellow of this College (1890). At St. Bartholomew's Hospital he held the post of casualty physician (1884-86) and became one of some twenty men then waiting in the hope of getting a permanent footing on the medical side of the Hospital. This prize was denied him, but in 1883 he became assistant physician to the Metropolitan Hospital, which was then almost entirely staffed by men educated at St. Bartholomew's, becoming in due course physician (1890) and consulting physician (1912), and in 1887 he was elected physician to the out-patients at the Hospital for Children

and Women, Waterloo Road, becoming physician (1896) and consulting physician (1913).

Haig was one of those the direction of whose medical energies was determined by his own sufferings, for he was a victim of migraine, and, finding that in his case this affliction could be controlled by diet, he set to work—I fancy, under the inspiration of Lauder Brunton—on this subject. At first inclined to believe that an alkaloid formed by bacterial activity in the intestines was the cause of the headache, he subsequently became convinced that uric acid was responsible, not only for this but for other ills that flesh is heir to, and that their panacea was a diet restricted as regards proteins, especially those later called purine bodies, and abstinence from wines. The scope of this hypothesis gradually expanded with the seven editions of his work, *Uric Acid as a Factor in the Causation of Disease* (1892-1908), the six editions of his *Diet and Food* (1898-1906), and the stream of papers, which began in 1884, in the *Med.-Chir. Transactions, The Journal of Physiology, The Practitioner, St. Bartholomew's Hospital Reports*, and elsewhere. His deductions rather outstripped the logical conclusions of his premisses: not only were they so far-reaching as to justify criticism, but the analytical method on which he depended for the estimation of uric acid was vigorously challenged, especially at the Royal Medico-Chirurgical Society. But however this may be, it should be remembered that Haig was an independent, industrious and earnest investigator, was honest in his whole-hearted belief in his results, and certainly greatly benefited many fellow sufferers. Failing health necessitated his retirement some ten years ago; although his symptoms were far from pathognomonic, he diagnosed angina pectoris, and I am informed that the post-mortem examination revealed advanced obstruction and calcification of the coronary arteries and much myocardial degeneration. Like Metchnikoff, he believed that the arterial change existed before he adopted dietetic precautions.

In conclusion, let me express my deep appreciation to the College for this high honour and for ever loyal support, to the Censors' Board and College Officers for their courteous assistance, and specially to the Registrar for constant help.

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With the President's Compliments

THE ANNUAL ADDRESS

DELIVERED TO THE

ROYAL COLLEGE OF PHYSICIANS OF LONDON

On Monday, 29 *March*, 1926

BY

THE PRESIDENT

SIR HUMPHRY ROLLESTON, BART., K.C.B., M.D., D.SC., D.C.L., LL.D.



London

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PRESIDENTIAL ADDRESS.

At the present time there are 376 Fellows of the College, as compared with 91 in 1825; of the present Fellows 12 have been elected under Bye-law XL (*b*), enacted on 26 January, 1911, whereby registered medical practitioners not members of the College, who have distinguished themselves in any branch of the science or practice of medicine, can be elected Fellows. Of these 12 there are 10 Fellows of the Royal Society. Analysis of the present 376 Fellows shows that London University heads the list with 149; then follow Cambridge with 97; Oxford with 51; Edinburgh with 36; Durham with 7; Manchester with 6; and Aberdeen with 5. Fifty years ago Edinburgh University headed the list, closely followed by London, and then came Cambridge, Oxford and St. Andrews.

The number of Members at the present time is 765, as compared with 658 a year ago and 454 in 1900. Seven have died, one has resigned and two have been re-elected.

The Licentiates admitted during the year 1925 numbered 898. During the same period 53 Licentiates became Members.

The Diplomates in Public Health admitted during 1925 numbered 56; in Tropical Medicine and Hygiene 71; in Ophthalmic Medicine and Surgery 26; in Psychological Medicine 19; and in Laryngology and Otology 13.

On 13 June, 1925, the last surviving extra-licentiate of the College, Edwyn John Slade King, ended his long life, and our list will no longer contain this group of its licentiates which dates from 1559 when the first extra-urban licentiate, William Leverett, was admitted. The licentiates were all under the authority of the College, and at first they were confined to a radius of seven miles from the City of London, but soon afterwards the grade of extra-licentiates was established and existed for just three hundred years. Dr. Slade King, who had been said to be a centenarian when two years ago a motion was brought forward at a meeting of the Ilfracombe Urban Council that he should be asked to resign the office of Medical Officer of Health, was really in his ninety-fifth year. He graduated M.D. at Edinburgh in 1853,

took our licence in 1858, the Diploma of Public Health of the Royal College of Physicians of Edinburgh in 1876, and had been Medical Officer of Health for Ilfracombe for nearly sixty years when he resigned in December, 1924. He was also for many years the County Coroner, and was the author of "Ilfracombe, the Healthiest English Watering Place."

DEATH OF QUEEN ALEXANDRA.

The following address of condolence was drawn up by the Registrar and sent to H.M. the King on the death of Queen Alexandra on 20 November, 1925.

To

His Most Excellent Majesty, George by the Grace of God of the United Kingdom of Great Britain and Ireland, and of the British Dominions beyond the Seas, King, Defender of the Faith, Emperor of India.

The Humble Address of the Royal College of Physicians of London.

"May it please Your Majesty.

"We your Majesty's dutiful and loyal subjects, the President and Fellows of the Royal College of Physicians of London humbly crave permission to assure your Majesty how deeply we share in the sorrow that has fallen on high and low in every part of your dominions through the death of the august and beloved Queen Mother, Her Majesty Queen Alexandra, and hereby pray to be allowed to offer to your Majesty, your Royal Consort, and all the Members of your Family, our heartfelt sympathy in this your great bereavement.

"As members of a profession whose endeavour it is to afford such alleviation as we may to the sum of human suffering, we desire now to pay a last grateful and reverent tribute to One who by her efforts and by her influence has done so much to aid us and our sister profession of nursing, in the successful accomplishment of this work.

"We cannot forget the magic touch with which Queen Alexandra transformed the Rose, erstwhile an emblem of strife in the history of this realm, into a peaceful emblem of comfort and consolation to multitudes of sick folk in the hospitals of your great metropolis.

"In the long line of Queens of England before her time none has laid roots so deep in the affections of her people by the native gift of warm sympathy and deep compassion for human suffering and human woes. Her joys have been her people's joys, her sorrows her people's sorrows. Freely she has given her love, freely too she has received.

"We commemorate therefore with reverent affection the peaceful ending of this long reign of loving-kindness, and we pray that the memory of its blessedness may bring comfort to your Majesty in your affliction."

HONOURS.

The following honours have been conferred by His Majesty the King on Fellows and Licentiates of the College during the Presidential year :—

Baronetcy : Sir John Bland-Sutton (Licentiate).

K.C.B. : Samuel Guise Moore (Licentiate).

K.C.V.O. : Sir Thomas Horder, Bart. (Fellow).

Knighthood : Robert Alfred Bolam (Fellow).
Frank Powell Connor (Licentiate).

C.S.I. : Thomas Henry Symons (Licentiate).

C.I.E. : Robert Henry Bott (Licentiate).
Clayton Alexander Francis Hingston (Licentiate.)
Roger Parker Wilson (Licentiate).

C.V.O. : Frederick Jeune Willans (Licentiate).

M.V.O., 4th Class: Russell Facey Wilkinson (Licentiate).

C.B.E. : Edgard Lucien de Chazal (Licentiate).

O.B.E. : John Scarbrough Dudding (Licentiate).

HARVEIAN CELEBRATION.

On 19 October, 1925, at midday the President and the College Officers attended the sermon which, under the revived conditions of the Sadlier Trust, was preached at the Church of St. Mary-le-Bow, Cheapside, by the Rector, the Reverend Stewart Gordon Ponsonby, who dealt with the lives and examples of Sir Thomas Browne, Sir Clifford Allbutt, Dr. J. A. Ormerod, and other Fellows of the College. At 4 p.m. the Harveian Oration was

delivered by Sir Frederick Mott, K.B.E., F.R.S., on "Heredity in Relation to Mental Disease." After the Harveian Oration the Baly Medal for distinction in physiology was presented to Professor Rudolf Magnus of Utrecht. The usual Harveian dinner in the evening was attended by seventeen guests of the College and sixty-nine Fellows.

RECEPTION.

The Centenary of the opening of the present house of the College on 25 June, 1825, was celebrated on 25 June, 1925, by a Conversazione arranged by the Treasurer, Dr. S. Phillips, and was attended by some four hundred Fellows, Members and guests, including ladies, and some of the descendants of Sir Henry Halford, who as President played so great a part in the removal of the College from the City to this site and at the original opening.

PERSONNEL OF THE COLLEGE, DELEGATES AND REPRESENTATION ON OTHER BODIES.

At the Quarterly Comitia on 30 April, 1925, Dr. Raymond Crawfurd was elected Registrar, and at the Comitia on 14 May was appointed a member of the Committee of Management to fill the vacancy caused by the death of Dr. J. A. Ormerod. Dr. R. A. Young was re-elected a member of the Committee of Management of the Conjoint Examining Board in England. The work falling on the Registrar has increased so much that the need for the appointment of an Assistant Registrar, a post provided for in the Bye-law XLIII but not filled up since 1909, was submitted to the Comitia on 28 January, 1926, and it was agreed to fill up this College office at the next Comitia ; in accordance with Bye-law LXII the President nominated one of the Fellows for this office.

Dr. W. Gordon went to the Congress of the International Association of Heliotherapy at Arcachon on 22–25 April, 1925, and represented the College.

To the Charcot Centenary Celebration held in Paris by the *Société de Neurologie* on 25–28 May, 1925, Dr. Gordon M. Holmes went as a delegate bearing an address from the College.

Sir Percival Horton-Smith Hartley represented the College at the Eleventh Conference of the National Association for the Prevention of Tuberculosis held in London on 6 and 7 July, 1925.

Your President represented the College at the Ninth International Prison Congress held in London on 3–8 August, 1925.

Emeritus Professor J. H. Abram was appointed representative Governor, University of Liverpool, in the place of Sir Dyce Duckworth.

Dr. Arthur Shadwell was appointed representative on Queen Victoria Jubilee Institute for Nurses in the place of Dr. H. G. Turney, resigned.

Sir Thomas Barlow and Sir Frederick Andrewes were re-elected as representatives on the Executive Committee of the Imperial Cancer Research Fund, Sir Wilmot Herringham representative on the Senate of the University of London, Sir Francis Champneys on the Central Midwives Board, Dr. F. D. Drewitt on the Committee of Management of the Chelsea Physic Garden.

RETIREMENT OF STANDING COUNSEL.

Our Junior Standing Counsel, Mr. Bryan Farrer, after twenty-five years' invaluable service to the College, is retiring from practice, and it is with the greatest regret that we are obliged to record this loss ; but our sincere wishes for a long and happy life follow him into the country. The College has been fortunate in securing as his successor Mr. Dighton N. Pollock, whose family combines distinction in law with a high record in physic.

LECTURES.

In the Oliver-Sharpey Lectures on 5 and 7 May, 1925, Dr. E. D. Adrian dealt with " The Interpretation of the Electromyogram," and gave a full account of this rather special physiological problem to which he has made many original contributions. He gave reasons for the belief that this study might throw light on the events occurring

in the spinal cord and so eventually be applicable to practical medicine.

Dr. S. A. K. Wilson, in the Croonian Lectures on 9, 11, 16 and 18 June, discussed " The Disorders of Motility and of Muscle Tone with special reference to the Corpus Striatum." These lectures were illustrated by many muscle tracings, cinematograph pictures and references to epidemic encephalitis and to extra-pyramidal disease on which he had done pioneer work. Incidentally he showed that micrographia is not pathognomonic of any one disease.

In his Bradshaw Lecture on 5 November, 1925, Professor Edwin Bramwell raised in an able manner new suggestions to explain the origin of the myopathies, correlating clinical observations with comparative anatomy and recent physiological knowledge, and discussing the possible influence of the endocrine glands.

Dr. Arthur Shadwell's FitzPatrick Lectures on 10 and 12 November, 1925, dealt with ancient Egyptian Medicine, and especially palæopathology and therapeutics, in a broad and attractive way.

In the Milroy Lectures on 2, 4 and 9 March, 1926, Professor W. C. C. Topley dealt with the subject of experimental epidemiology which he illustrated from his extensive laboratory investigations, checked by the expert statistical criticism of our Fellow Major Greenwood, and enriched with a philosophical discussion of the principles of modern epidemiology

Dr. Bernard Hart gave the Goulstonian Lectures on 11, 16, and 18 March, 1926, on the development of psychopathology and its place in medicine, and in a philosophic manner, authoritative from its obvious basis of much thought and experience, critically analysed the growth of our knowledge and the influence of Charcot, Pierre Janet and Freud.

In the Lumleian Lectures on 23 and 25 March, 1926, Sir Thomas Horder dealt in a critical and thoroughly comprehensive manner with the different forms of endocarditis, laid stress on the special features of rheumatic heart affection, and illustrated the characters of septic endocarditis from the wide experience provided by his two series of cases.

MEDALS AND SCHOLARSHIPS.

The *Baly Medal* was awarded to Professor Rudolf Magnus of Utrecht.

The *Streatfeild Research Scholarship* to Mr. Norman Leslie Capener.

The *Murchison Scholarship* to Miss Sidney Elizabeth Croskery, M.B. (awarded by the University of Edinburgh).

The *Jenks Memorial Scholarship* to Mr. Oliver Ive.

GIFTS TO THE COLLEGE.

Sir Frederick Mott generously presented to the College six pieces of old Sheffield plate of the best period, which had been in the possession of his family for a century.

Dr. Percy Kidd presented to the College a Piorry's pleximeter, given him by M. de Lamotte, one of Piorry's pupils.

Donations to the Library are mentioned under that heading (p. 19).

FINANCE.

The total income of the College during the financial year ending 29 September, 1925, and including £360 1*s*. 3*d*. in trust for special purposes (Library, Museum, &c.), was £17,455 11*s*. 11*d*. Of this sum £12,628 3*s*. 11*d*. was derived from the Conjoint Board, and the remaining £4,827 8*s*. from other sources.

The expenditure during the year was £7,815 16*s*. 9*d*., being some £3,000 more than the receipts, apart from the sum received from the Conjoint Board, although the College enjoys the benefit of a perpetual lease of its site and premises and has no payment to make for rent.

During the past ten years the receipts from the Conjoint Board have enabled investments to be made which have increased the annual income from that source from £270 to £1,700, but the receipts from the Conjoint Board cannot be expected to keep up to the present level (in the current year they will be lessened), and it is desirable that economy should be exercised with the aim that the College may eventually rest on a basis financially independent of

the Conjoint Board. The necessity is the greater as the requirements of the College may necessitate some increase in its premises or accommodation.

The number of trust funds administered by the College gradually increases and a sum of £1,185 9*s* 11*d*. was distributed by the College during the financial year as fees to Lecturers, as Scholarships and in Prizes. The College during the last ten years has become joint trustee with other bodies for three new trusts—the Streatfeild Research Fund, the Conway Evans Prizes and the Joseph Rogers Prizes, the joint income of which amounts to about £480 per annum.

STREATFEILD RESEARCH SCHOLARSHIP.

The supervision of the Streatfeild Research Scholarship fund, consisting of £10,000 2½ per cent. Annuities, has been placed by the Trustees, the Presidents for the time being of the Royal College of Physicians and the Royal College of Surgeons, in the hands of Mr. R. H. Hoare, F.C.A., in order to ensure continuity of its administration and the presentation of the accounts annually to the Official Trustees of Charitable Funds.

At the request of the Presidents Mr. Hoare has drawn up complete accounts of the fund from its initiation in 1916, and they will be in future kept apart from the accounts of the College of Physicians.

CONWAY EVANS PRIZES.

The administration of the income from this fund, amounting to £193 10*s*. annually, has been placed by the Trustees, the Presidents for the time being of the Royal Society and of the Royal College of Physicians, in the hands of Mr. R. H. Hoare, F.C.A. The Presidents decided in May, 1925, that it was inexpedient to make any award until the income available for award shall have further accumulated.

JOSEPH ROGERS PRIZE.

The investments for this prize were accepted from the Executors of the late Dr. Joseph Rogers in 1925 by the

President of the Royal College of Physicians and the Master of the Society of Apothecaries for the time being. The supervision of the accounts has been placed in the hands of Mr. Bingham Watson, Solicitor and Clerk to the Society of Apothecaries.

The first award will be made by the Trustees in 1926 and advertisements have already been published for Competitors for the Prize.

COMMITTEES OF THE COLLEGE.

At the Comitia on 14 May, 1925, a committee for revision of the Bye-laws was appointed consisting of the President, Treasurer, Harveian Librarian, the Registrar and Dr. A. M. H. Gray.

In response to a letter from Sir Donald MacAlister, President of the General Medical Council, inviting the College to submit suggestions as to omissions from, additions to, or alterations in the new edition of the British Pharmacopœia, a committee was appointed consisting of Sir Nestor Tirard, Sir William Hale-White, Sir John Rose Bradford, Dr. P. Hamill and Professor A. J. Clark.

GENERAL MEDICAL COUNCIL.

In 1891 the General Medical Council challenged the privilege of the College to admit names to the Medical Register by its single Diploma of the Licence and without any additional qualification. The College was thus compelled to substantiate its claim by a law suit, and on 8 March, 1893, judgment was given in their favour in the Court of Queen's Bench, declaring that they were a Body able to hold examinations and to grant a diploma in Medicine, Surgery and Midwifery independently and without acting in combination with any other medical corporation or body, and costs were awarded to them.

On 26 May, 1924, the General Medical Council's Executive Committee (of which your representative was not then a member) took up the matter again on the ground that this College no longer held examinations in Surgery and passed the following resolution :—

> " That persons could not be registered in virtue of the L.R.C.P. London Diploma unaccompanied by

the M.R.C.S. Diploma in cases where the qualifying examination for this Diploma was a joint examination in Medicine, Surgery and Midwifery conducted under Section 3 (*b*) of the Medical Act, 1886: that the attention of the College be drawn to the footnote of their Diploma, which was incorrect unless the Licence in question was granted under Section 3 (*a*) after an examination in Medicine, Surgery and Midwifery held by the College itself; and that in any case the Licence did not entitle its holder to practise Medicine, Surgery and Midwifery as a legally qualified practitioner in the United Kindgom unless he was registered by the Council."

The Resolution of the Executive Committee raises three controversial points :—

(1) That the Licence of the Royal College of Physicians cannot be registered unless the Diploma is presented along with the Diploma of Membership of the Royal College of Surgeons.

(2) That the footnote of the Diploma is incorrect in that it states that the Licence of the Royal College of Physicians is a full and complete Licence to the unfettered practice of Medical Science in all its branches.

(3) That the footnote of the Diploma is misleading in that it suggests that the Diploma is a legal authority to practise, without registration.

After correspondence between the Registrar, the late Dr. J. A. Ormerod, acting in consultation with our legal advisers and Mr. F. G. Hallett, and the General Medical Council, the position was eventually modified by the following substituted resolution of the Executive Committee of the General Medical Council passed on 23 November, 1925 :—

"That when a joint qualifying examination in Medicine, Surgery and Midwifery has been held by the two Royal Colleges under the Medical Act

(1858) Section 19, or the Medical Act (1886), Section 3 (*b*), either College may transmit to the Registrar a Certified List of the Candidates for its diploma who have passed such joint qualifying examination, and any applicant who presents to the Registrar the registrable Diploma of either College, or is certified by such College to have received such Diploma and whose name appears on such Certified List, shall be accepted by the Registrar as eligible for registration in the Medical Register."

This Resolution expressly avows :—

(1) That the Licence of the Royal College of Physicians can be registered apart from the Diploma of Membership of the Royal College of Surgeons, provided that the name of the Licentiate appears on a Certified List of Candidates who have passed the joint qualifying Examination of both Colleges.

(2) That the Diploma of a Licentiate of the Royal College of Physicians can be registered as a full and complete Licence to the unfettered practice of Medical Science in all its branches, on the same condition.

The College therefore has succeeded in rebutting both the leading contentions of the General Medical Council.

It is the examination that is Conjoint, *not* the Diploma.

It was then agreed on 23 November, 1925, that :—

(i) The Certified List should be headed :—

" The following candidates were duly admitted Licentiates of the College on ...., having passed the Final Examination in Medicine, Surgery and Midwifery of the Conjoint Examining Board in England." It may be pcinted out that the original heading of the Certified List was not called in question by the General Medical Council, and the alteration was suggested by the Royal College of Physicians on the advice of the two College Counsel, as a means of making it clear beyond all possibility

of question that the Licentiate had passed also the Examination for the Membership of the Royal College of Surgeons.

(ii) The foot-note of the L.R.C.P. Diploma, signed by the Registrar, should now read :—

" I certify that C.D., to whom this Licence has been granted by the College, and whose signature is subjoined, has been duly admitted to practise Physic, as a Licentiate of the College, and that such Licence, *when duly registered under the Medical Acts,* is a legal authority to him to practise Medicine, Surgery and Midwifery, and to dispense Medicines, but only to those who are his own patients."

instead of, as since 1869, when it was approved by the General Medical Council :—

" I certify that C.D., to whom this Licence has been granted by the College, and whose signature is subjoined, has been duly admitted to practise Physic, as a Licentiate of the College, and that such Licence is a legal authority to him to practise Medicine, Surgery and Midwifery, and to dispense Medicines, but only to those who are his own patients."

The College thereby concedes that the form of its foot-note in the past, though strictly accurate, may have been misleading in some case or cases, in that it omitted mention of the necessity of registration by the General Medical Council.

In view of this it is important to remind the College that a Diploma is never issued by the College to a Licentiate unaccompanied by a " Medical Registration " leaflet which states among other things that " No person who is unregistered is legally qualified." These leaflets have been supplied to the College each quarter for many years by the General Medical Council.

Until the existing stock of Diplomas has been exhausted the College has undertaken to attach to each Diploma, in lieu of the words in italics in the amended foot-note, a slip bearing the words " This Licence does not entitle the holder to practise Medicine, Surgery or Midwifery in the United Kingdom, until he has been registered under the Medical Acts."

All the correspondence which has passed in the course of this controversy, with the exception of a few early letters not now recoverable owing to the death of Dr. Ormerod, will be placed in one parcel, labelled " Controversy between Royal College of Physicians and General Medical Council (1924–1925) " and will be preserved in the Strong Room of the College.

CENSORS' BOARD.

Disciplinary.—A licentiate whose name had been erased from the Medical Register for drunkenness was last year induced to enter an inebriate home, and pending the reports as to his conduct the Board deferred any report to the College. The reports have been most satisfactory, the licentiate has become a total abstainer and his name has been restored to the Medical Register.

A licentiate, Charles Bertrand Wagstaff, who had been found guilty by the decree of the Probate, Divorce, and Admiralty Division (Divorce) of adultery with Lilian Savage, a married woman, with whose family he stood in professional relationship, was summoned by the General Medical Council, but did not appear, and was judged to have been guilty of infamous conduct in a professional respect, and the Registrar was directed to erase his name from the Medical Register. He was summoned but did not appear before the Censors' Board, who recommended the College to remove his name from the List of Licentiates. This was done.

Membership Examination.—The numbers of candidates have been as follows :—

	Applicants.	Referred.	Approved and admitted as Members.
1925.			
April	28	10	18
July	34	10	24
October	53	19	34
1926.			
January ..	65	32	33
	180	71	109 or 61 per cent.

In the previous year there were 116 applicants; in 1923–24, 94; in 1922–23, 90; and in 1913, the year before the War, 45 applicants. The percentages of approvals in the last three years have been 46, 55 and 60.

The Special Committee appointed on 23 July, 1924, to revise the Bye-laws and Regulations relating to the Examination for the Membership presented reports on 6th April and 30 July. Eventually, after some discussion, the Rules were altered, the two important changes being in Bye-laws CXII and CXVIII. The amended Bye-laws now read:—

Bye-law CXII.

Every Candidate for the Membership of the College shall furnish proof of having attained the age of twenty-three years.

Bye-law CXVIII.

Any Candidate admitted to examination under Bye-laws CXVII and CXVIIA, who has attained the age of 30 years, and who can produce testimonials as to moral character and conduct and his general and professional attainments, shall be permitted to submit work by himself in any branch of medical science or in general literature that has been published, and if the Censors' Board decide that such work is of sufficient merit to excuse the Candidate the whole or part of the usual examination, the Censors' Board may modify the examination as they think fit.

In October, 1925, the Comitia gave leave for any alteration in the days of the examination rendered necessary by increase in the number of candidates. Bye-law CXII came into force in October, 1925, when there were eight candidates under twenty-five years of age. There were not any such at the succeeding examination. Bye-law CXVII came into force in January, 1926. A very large number of enquiries (about 200) were received, and eventually 23 candidates sent in published work; of these 4 were granted exemption from the whole examination, 5 were examined at the final oral only (4 passing), 2 were exempted from the papers and one from the clinical

examination ; 11 were not granted any exemption, and of these one only went on with the examination.

The Censors are considering the question of altering the character of the pathological examination so as to bring it into more direct relation with the present requirements.

The marks awarded for the optional subject of languages, for which credit is given, have been altered so as to be slightly higher than before ; the maximum is 20 marks as compared with 360 for the rest of the examination.

COMMITTEE OF MANAGEMENT.

At the end of March, 1925, the Committee, after consultation with past and present Examiners in Tropical Medicine and Hygiene and with Dr. Andrew Balfour, Director of the London School of Hygiene and Tropical Medicine, recommended to the Royal Colleges an extension of the course of study for the Diploma of Tropical Medicine and Hygiene from three to five months. This recommendation was approved by the Royal Colleges of Physicians and Surgeons and came into force on 1 October last. The first examination under the new regulations was held in February.

The Committee also granted the request of the College of Medicine of the University of Wales that no schedule of attendance be accepted by this Board from students of the University unless they are signed or countersigned by the Secretary or the Dean of the Medical Faculty. It has been a long established practice of the Board to accede to similar requests. The action of the Committee was subsequently approved by the Royal College of Physicians.

In July, 1925, the Committee decided that when a student, whose name had been removed by the General Medical Council from the list of registered medical students, produces evidence that the Council has restored his name to the list, he may be admitted to the examinations of the Board on presenting the required certificates of professional study.

In October, 1925, the Committee decided that an examination in Chemistry and Physics conducted at a constituent college of a University be not recognised as

exempting a candidate from the first professional examination, unless a certificate is produced from the University showing that the candidate is thereby exempted from the First M.B. Examination of the University in Chemistry and Physics.

It was also determined that a member of the Colleges of Physicians and Surgeons of Bombay be admitted to Part I of the Second Examination (Anatomy and Physiology) and afterwards to the Final Examination on producing evidence of having completed the five years curriculum at that College.

In December, 1925, the Committee recommended the Royal Colleges to restore to the list of recognised foreign Universities certain Universities in Germany, Austria, Czecho-Slovakia and Hungary which had been removed from the list during the War. This recommendation was approved by the Royal College of Physicians and was referred back by the Council of the Royal College of Surgeons for information as to the existing conditions of admission of British doctors to examinations entitling them to practise in those countries.

At the same time the Committee recommended the insertion of new disciplinary conditions in the Regulations. The recommendation was approved by both the Royal Colleges.

THE CONTINUATION OF MUNK'S "ROLL OF THE COLLEGE."

The Library Committee have decided that steps should to taken to begin the preparation of a Fourth Volume of Munk's *Roll of the College.* The third and last volume of that work brought the *Roll* down to the year 1825, and the new volume in contemplation, when completed, will contain biographies of the Fellows, Licentiates and Extra-Licentiates on the Roll from 1825 to 1858. The year 1858 has been chosen for the conclusion of the volume, since in that year the Medical Act came into force, and by its provisions the new grades of Members and Licentiates were instituted in place of the Licentiates and Extra-Licentiates. The new volume will contain some 740 Biographies, and considerable time will be required before

it can be completed. The Library Committee have placed the preparation and supervision of the work in the hands of the Harveian Librarian, and the volume will be constructed as far as possible on the lines laid down by the late Dr. Munk.

THE LIBRARY.

During the year the usual work in connection with the Library has been carried on, and in addition, special work has either been begun or completed. A new catalogue of the portraits, busts, miniatures, silver and other objects of interest in the College is in the press, and will shortly be issued. The existing catalogue of the manuscripts is now out of date, and steps are being taken to make a new catalogue which will include all the manuscripts in the College Library. During the winter four societies have been received at the College, and have been shown the various objects of interest in its possession. Among the donations to the Library may be mentioned three valuable Latin Bibles from the family of the late Dr. J. A. Ormerod; the notebooks of Dr. Thomas Wharton (1614–1673) were presented by Mrs. Charles Darwin, his lineal descendant, at the wise suggestion of Dr. J. P. Hedley.

Obituary Notices.

During the Presidential year there have been 9, or 2·4 per cent., of deaths among the Fellows, as compared with a mortality of 12, 12 and 10 in the previous three years. Only one of the nine Fellows was under 60 years of age, and four were over 80. The average of the deceased Fellows is 70 years as compared with 73, 70, and 72 years in the three preceding years. Five of the deceased Fellows worked in the country and four in London.

Name.	*Date of Death.*	*Age.*
	1925.	
Montagu Lubbock	8 April	82
Robert James McLean Buchanan	19 April	60
Howard Henry Tooth	13 May	69
James William Russell	20 September	62
Robert Charles Brown	23 November	89
Richard Douglas Powell	15 December	83
	1926.	
Richard Caton	2 January	83
Edward Granville Browne	5 January	63
George Herbert Hunt	9 January	41

MONTAGU LUBBOCK.

Montagu Lubbock, who died on 8 April, 1925, had so long ceased to play any active part in medical life in London that he was but little known to the majority of the Fellows of the College. He came of a distinguished family, being the fifth son of Sir John William Lubbock, third Baronet, of High Elms, Kent, who was a Vice-President of the Royal Society; his eldest brother was the first Lord Avebury, the originator of Bank-holidays, and the popular writer on natural history and the best books. Born on 24 May, 1842, he went to Eton in 1853 and there had a phenomenal record as an athlete. On leaving Eton in 1859, he obtained a commission in the 11th Kent Volunteers, and for a time was in business in the City. In October, 1870, he entered the Medical

School of Guy's Hospital and qualified M.R.C.S., L.R.C.P. in 1872, but remained at the Hospital though not holding any resident appointment until 1875; he then worked in Paris, and, after obtaining honours in obstetrics in the M.B. London in 1878, took the Doctorate of Medicine of the Medical Faculty of Paris in 1879 with a thesis "Du diagnostic des différentes formes de méningite cérébrale aiguë" (pp. 89) which, containing a number of cases from the wards of Guy's and the Evelina Hospitals, pointed out that acute meningitis in the aged, though rare, was likely to be confused with typhoid fever. As a result of his association with the Paris school he translated and edited Professor S. Jaccoud's *The Curability and Treatment of Pulmonary Phthisis* (1895) from the original text which appeared before Koch's description of the tubercle bacillus. He also translated for the New Sydenham Society Professor Pierre Marie's *Lectures on Diseases of the Spinal Cord* (1895).

After taking the M.D. London in 1880, Lubbock started on the ladder of a young consultant in London, and was assistant physician for a year (7 February, 1881, to 6 February, 1882) to the West London Hospital, to the Hospital for Sick Children, Great Ormond Street, for thirteen years (October 1881–December 1894), and to Charing Cross Hospital for eight years (1882–1890), where he was lecturer on practical medicine (1882–1885) and curator of the museum (1888–1892). He was also physician to the Royal Exchange Assurance Company for thirty-three years (1883–1916). In the evening of his life he was a familiar figure at the Athenæum of which he had been a member since 1882.

ROBERT JAMES McLEAN BUCHANAN.

Robert James McLean Buchanan's death from pneumonia on 19 April, 1925, removed a prominent physician in Liverpool, whose career, not devoid of romance, was a remarkable example of perseverance and varied ability. His position was entirely due to his own exertions, and his proudest boast was said to be that as an apprentice joiner he assisted in building the Royal Infirmary, Liverpool, on the staff of which he subsequently served for twenty-four years.

Born on 23 July, 1864, as the third son of James Buchanan, his interest in medicine was probably aroused by his experience during the erection of the Royal Infirmary, for, before the end of his apprenticeship, he had decided to follow our profession. Entering University College, Liverpool, in 1883, he was a distinguished student, taking the M.B., B.Ch. (Honours in Medicine), 1888, and M.D. (Gold Medal), 1889, Victoria, and proceeding to the M.D. Liverpool, in 1904. At this College he became a Member in 1897, and was elected a Fellow in 1908. His first hospital appointment, physician to the Stanley Hospital, was gained in 1900, but he resigned in the following year, when he was elected assistant physician at the Royal Infirmary, Liverpool, becoming physician in 1909, and consulting physician in 1925, after his retirement under the age limit of sixty years. He was also assistant physician to the Liverpool Hospital for Consumption and Diseases of the Chest (1895–1900). At the University of Liverpool he was appointed assistant lecturer and demonstrator in toxicology in 1905, two years after the University received its charter, and Professor of Forensic Medicine in March, 1909 ; in this same year he also became lecturer on clinical medicine and retained these posts until December, 1924. During the War he was one of the physicians, with the rank of Captain R.A.M.C., on the staff of the 1st Western General Hospital. A unique honour was conferred on him by his medical colleagues at Southport by his presidential election of the local medical society, an office never previously given to anyone living outside the town.

His published works included a monograph on *Rabies and Hydrophobia* (1889), textbooks on *Forensic Medicine* (8th edition in 1915), and on *The Blood in Health and Disease* (1909), and articles on diseases of the thorax, spleen and thymus in the *Practical Encyclopædia of Medicine and Surgery.*

While a hard worker with high ideals, he had many interests outside his profession ; he was an expert photographer and utilized this accomplishment in making photomicrographs ; an artist with a fine eye for colour and composition, he showed regularly at exhibitions ; a keen fisherman acquainted with the best reaches for trout on nearly every stream within fifty miles of Liverpool;

an ardent mason who had founded no less than three lodges, the last being the Liverpool University Lodge of which he was the first master; and a lover of music. He combined practical ability with something of the visionary; though he did not suffer fools gladly, he was ever willing to do services to his fellows and pupils. He was thus a many-sided man. Some five years ago he had the misfortune of losing his elder son, a blow from which he never really recovered.

HOWARD HENRY TOOTH.

On the 13 May, 1925, a second attack of cerebral hæmorrhage removed from our list Howard Henry Tooth, who had filled many posts of responsibility in the medical life of London.

Born at Hove, Sussex, on 22 April, 1856, he was the eldest child of Frederick Tooth, of Hove. After being educated at Rugby (1871–73) he was admitted a pensioner at St. John's College, Cambridge, on 6 October, 1873, graduated in 1876 with a third class in the Natural Science Tripos, and subsequently proceeded to the degrees of M.B. (1880), M.A. (1881), and M.D. (1886), and examined for the final M.B. for several years (1911–14). His thesis for the M.D. degree on the peroneal type of muscular atrophy (*Brain*, 1888, x, 243) dealt with this condition described, in the year he read his thesis, by Charcot and Marie. Tooth began his connection with St. Bartholomew's Hospital on 1 October 1877, and was house physician (1880–81), casualty physician (1881–82), assistant demonstrator of physiology (1883–85), and medical registrar and demonstrator of morbid anatomy (1893–5). He was elected assistant physician (1895), physician (1906), and consulting physician (1921) in due course. In the meanwhile he passed through the offices of assistant physician (1881) and physician (1889) at the Metropolitan Hospital, then mainly staffed from his own school, becoming consulting physician in 1896. At this College he was elected a Member in 1881, a Fellow in 1888, a Councillor (1906–8) and a Censor (1913, 1914), and delivered the Goulstonian Lectures in 1889 on "Secondary Degenerations of the Spinal Cord" (*Brit. Med. Journ.*, 1889, i, 753, 825, 873) which established his position as a rising neurologist.

As a general physician he made two contributions to the *Transactions of the Pathological Society* of London on "Ulcerative Colitis" (1894, xlv, 66) and on "Acute Bronchio-lectasis" (1897, xlviii, 30), and his position was shown by his election as medical secretary of the Royal Medico-Chirurgical Society (1906–7) and as President of the Section of Neurology of the Royal Society of Medicine (1912–13). He was also physician to the Portland Hospital in the Boer War (1899–1900), and was created C.M.G. in April, 1901, his name being missed out of the original list, but appearing the next day. He commanded the Medical Unit of the Officers' Training Corps of the London University and, during the first year of the Great War, was in charge of the 1st London General Hospital, staffed by St. Bartholomew's Hospital, under the Territorial Scheme, at Camberwell. In 1916 he went as consulting physician with the rank of Colonel A.M.S., to Malta, where in the next year he was made M.D. Malta, *honoris causâ*, with his colleague, Sir Archibald Garrod ; in 1917 he proceeded to the Italian Front and was mentioned three times in dispatches and awarded the C.B. (Military) in 1918. After his return to this country he was an inspector of examinations for the General Medical Council from April, 1920, to October, 1921, and reported on sixteen universities and five examining bodies, a duty for which his experience as an examiner at the Conjoint Board, and the Universities of Durham (1909) and Cambridge, and his tact admirably fitted him.

It is only right to insist on his wide activities as a general physician for almost all his published work dealt with neurology. He was assistant physician (13 December, 1887), physician to out-patients (11 April, 1893), physician (17 December, 1907), and consulting physician (8 February, 1921) to the National Hospital for the Paralysed and Epileptic, Queen Square. In his Presidential Address to the Section of Neurology of the Royal Society of Medicine on "The Growth and Survival Period of Intra-cranial Tumours, based on Records of Five Hundred Cases, with Special Reference to the Pathology of the Gliomata" (*Brain*, 1912–13, xxxv, 61–108), and his paper on the treatment of cerebral tumours, read before the International Medical Congress in London in 1913, he took a cautious view of operative interference. His

Presidential Address occupied his attention for two years, and was characteristic of the extraordinary patience and conscientious thoroughness with which he carried out whatever he undertook. As a general physician with a special bent for neurology, he wrote the article on cerebral hæmorrhage in Sir Clifford Allbutt's "System of Medicine" (1899, vii, 605).

Tooth had many interests outside his profession; in his younger days he played the violin regularly in an orchestra, he was a keen bicyclist, an accomplished worker in metal and wood, and after his retirement to The Moat, Hadleigh, Suffolk, became an ardent gardener. Handsome and cheery, his sunny disposition and good nature made him universally popular. But his unselfish character and regard for the feelings of others militated in some degree against success as commonly estimated, for he was devoid of any self-assertion and of the incisive manner that carries conviction. Thus his early promise was hardly fulfilled in his later career. In part, no doubt, this was due to ill-health, which handicapped him for many years and necessitated three operations of considerable magnitude.

JAMES WILLIAM RUSSELL.

By the death on 20 September, 1925, at Hay Tor, Devonshire, of James William Russell from left hemiplegia and cardiac failure, Birmingham lost a high-minded eminent physician. Born on 16 April, 1863, in Newhall Street, he came of a medical family of local distinction; his father, James Russell (1818–1885), was physician to the General Hospital (1859–1885), and a Fellow of this College, and his grandfather, also James Russell, was well known as a general practitioner. His mother, Mary Elizabeth Wills, was a sister of Mr. Justice Alfred Wills.

After education at Edgbaston Proprietary School he went up in October, 1881, to Trinity Hall, Cambridge, obtaining a scholarship in June, 1883, and in June, 1884, went out in the mathematical tripos parts I and II. He then returned to Birmingham for three years and started his medical career. In October, 1887, he entered the Medical School of Guy's Hospital and, after taking the M.B., B.C. Cambridge, in 1890, was resident obstetric

assistant and house physician (1890–1) ; after a post-graduate course at Vienna, he returned to Birmingham in March, 1891, as resident medical officer at the General Hospital, where fifteen months later he was appointed assistant physician. In 1893 he proceeded to the M.D. Cambridge, and became a Member of this College ; in 1905 was elected a Fellow, served on the Council (1921–23), and was an examiner for the licence at the time of his death. After twenty years in the out-patient room he became physician to the General Hospital in January, 1912. His high reputation for ability and ever-ready help accounted for his position as consulting physician to eight other hospitals in the district ; one of his colleagues wrote : " He has been looked upon for years as everything which stands for the honour and dignity of the profession here." He was " the doctors' doctor," was most unselfish, and if he had a fault it was an excessive modesty and sensitiveness.

Like his father, he was joint professor of medicine (1917–25), and had a high reputation as a sound teacher. His contributions to literature, though not very numerous, covered a wide field ; he wrote because he had something to say, not because he had to say something. Together with the late Dr. Robert Saundby he published, under the title " An Unexplained Condition of Chronic Cyanosis ", (*Lancet*, 1902, i, 515), the first case reported in this country of polycythæmia rubra, described by Vaquez in 1892, and more widely brought to our notice by the late Sir William Osler's papers in 1903 and 1904. He also wrote on certain variations in the motor phenomena of chorea (*Lancet*, 1899, i, 894) ; the after-history of gastric ulcer (*ibid.*, 1904, i, 288) ; temperature in malignant disease of the liver and bile passages (*Brit. Med. Journ.*, 1907, i, 312) ; a study of orthostatic albuminuria by means of graphic records (*Quart. Journ. Med.*, Oxford, 1922–23, xvi, 73), based on the Ingleby Lectures delivered in the University of Birmingham in May, 1922 ; two cases of unilateral œdema (*Lancet*, 1923, ii, 925), and a posthumous paper on the origin and significance of postural (orthostatic) albuminuria (*ibid.*, 1925, ii, 683). He was also Editor of of the Birmingham Medical Review (1894–1903).

Much of his life thus devoted to the service of man was hampered by ill-health ; as an undergraduate he was a

martyr to asthma, which returned with bronchitis in his later years; and after his unselfishly arduous duties during the War as Major R.A.M.C.T. at the 1st Southern General Hospital, signs of pulmonary tuberculosis appeared. Thin, with refined, almost ascetic, features and grey hair, he was a striking figure. Several interests other than professional appealed to his broad-minded conception of life; his uncle, Sir Alfred Wills, initiated him into alpine climbing, and in his younger days he was a keen rock-climber; he was a violinist of considerable talent, and his own delight in music characteristically resulted in the organisation of promenade orchestral concerts to raise the public taste.

ROBERT CHARLES BROWN.

Robert Charles Brown, who died on 23 November, 1925, at 27 Winckley Square, Preston, was born on 2 October, 1836, in the same house where, except for a period of ten years (1855–65), he spent his whole life. He was the fourth child and third son of Robert Brown, F.R.C.S., an alderman of the borough and secretary of a committee appointed in 1845 to establish a hospital or infirmary for Preston and the neighbourhood. Educated at the local Grammar School, he was apprenticed to Dr. Thomas Dixon in the town for two years and then in October, 1855, entered at King's College Hospital, qualifying in 1858 at the College of Surgeons and the Society of Apothecaries. His father's death in that year rendered further residence in London impossible, and he returned in December to Preston as house surgeon to the Dispensary where he remained until March, 1863, when he was elected one of the honorary Medical Officers and commenced private practice. In the meanwhile, with intervals of study in London, Edinburgh and Dublin, he obtained the M.B. London (1861), and the F.R.C.S. (1862). In his reminiscences, *Sixty-four Years a Doctor* (1922), dedicated to Sir Clifford Allbutt, who was born and died in the same years as himself, he described how he prepared at the ages of 27, 38, 40 and 64 years to take the M.D. London, and on the last occasion thought better of presenting himself just before the examination. In

1865 he became a member and in 1908 a Fellow of this College, being admitted by Sir Richard Douglas Powell, whose death was so soon to follow his. When the Preston and County of Lancashire Royal Infirmary was opened in 1870, he was appointed physician, and of the original staff he had long been the sole survivor. It was characteristic of his devotion to the Institution that during the War when there was a dearth of house surgeons he carried out their morning work at the Infirmary for several months. His life in Preston was so full of activities, charitable and professional, including fifty-five years' association with the factories, and twenty-seven years as police surgeon, an appointment he held till 1921, that it is not surprising that on 29 September, 1910, he received the rare honour of the freedom of his native borough. Ambulance work attracted his enthusiastic support, and he did much to enable his fellow-townsmen to share his delight in music, which, as shown in his address to the Fylde Medical Society on "Music and Medicine" (1894), he believed had a real use in furthering convalescence and benefiting neurasthenia ; by presenting organs to the Infirmary and to other institutions he put this conviction into practice. Incidentally he was of opinion that most men remarkable for longevity have been fond of music, and that among musicians suicide is comparatively very rare. After a survey of what was best elsewhere he provided the Infirmary with isolation wards, an up-to-date operating theatre, X-ray installation, and conservatories, his benefactions in all amounting to more than £10,000. But his philanthropy was not confined to his own surroundings, for, probably influenced by Sir Clifford Allbutt, he was a generous benefactor to the Cambridge Research Hospital, where he founded a studentship for pathological research and provided a photomicrographic outfit, a complete X-ray apparatus, and bequeathed his "body to the Directors of the Research Hospital, Cambridge," which was making an intensive study of chronic arthritis, authorizing them "to retain such parts of it as they consider may be suitable additions to their Pathological Museum." In accordance therewith his brain, hip, finger, and bladder are in the Museum.

On 23 May, 1912, the University of Cambridge conferred on him the degree of M.A., *honoris causâ,* in recognition

of his generosity to the Research Hospital which he opened on the following day before about five hundred persons. On 13 August, 1919, he received a knighthood for his philanthropic services.

Retiring from practice about the age of four score years and still becoming infirm from arthritis, he remained fully in sympathy with current events and was active as a writer; in his eighty-sixth year his *Sixty-four Years a Doctor*, the proceeds of which went to the Infirmary, appeared, and in his eighty-ninth and last year of life he began to record his own recollections of the past benefactors of Preston. Pamphlets also came from his pen, such as "Origin and Progress of Horrockses, Crewdson & Co., A Lesson in Perseverance for Everyone," the proceeds of which were also given in a purse to Princess Mary on opening an extension of the Royal Infirmary, Preston, on 6 August, 1915. His last pamphlet, "A Romance in Real Life: From Flag Lieutenant in 1899 to Admiral, C.B., K.C.M.G., K.C.V.O., . . . in 1924," appeared in the year before his death.

A man of most kindly nature and full of charity for all his fellows, he was extremely simple in his tastes and devoid of any desire to spend money on his own behalf, often indeed denying himself that he might have more to give others. Towards the end of his long life he said that he had "found the value of money now that he was giving it away."

RICHARD DOUGLAS POWELL.

Third on the Roll and first elected President almost twenty years ago, Richard Douglas Powell, who died on 15 December, 1925, after a short illness, was born at Walthamstow on 25 September, 1842, and was the second son of Captain Scott Powell and Eliza, daughter of Richard Meeke. His only sister, Emily Armett, married Henry Arnott, sometime assistant surgeon to the Middlesex (1868) and St. Thomas's Hospitals, to the latter of which he migrated with the late Dr. Charles Murchison in 1871, and now Honorary Canon of Rochester.

His boyhood was spent at Toft, near Cambridge, where he laid the foundation of a keen interest in natural

history and sport which formed his chief relaxations in later life. Educated at a private school in Streatham, he wished to follow his father and two brothers who were in the army ; but for family reasons he abandoned this in favour of medicine, and started work at University College about 1859, where he became firm friends with Henry Arnott. Powell passed across to University College Hospital in October, 1863, where he qualified as a Member of the Royal College of Surgeons of England and M.B. London in 1865, taking first class honours in medicine, and proceeded to the M.D. degree with first class honours and qualifying for the gold medal next year. In November, 1864, he became physicians' assistant, a resident post, now house physician, to Sir William Jenner and Dr. C. J. Hare, who, it may be noted, were elected assistant physicians on the same day in 1850 and died within four days of each other in December, 1898. Powell also held the resident obstetric post in 1866, was appointed in 1867 to take charge of medical out-patients for a time, and in December, 1869, applied for the assistant physiciancy at University College Hospital when Dr. F. T. Roberts was elected. In the meanwhile, he had been resident clinical assistant at the Brompton Hospital for Consumption and Diseases of the Chest, where he was elected assistant physician on 16 January, 1868, physician on 29 April, 1875, and consulting physician on 30 May, 1889. He was also physician to the Marylebone Dispensary (1867) and assistant physician to the Evelina Hospital for Sick Children.

His appointments at teaching schools began in 1871 when, together with his fellow-student, the late G. Vivian Poore, and three years after T. H. Green, he was elected assistant physician to Charing Cross Hospital, where he was joined in 1876 by Sir Thomas Barlow, who followed him as President of our College, and by the late Sir Rickman J. Godlee, subsequently President of the Royal College of Surgeons of England (1911–1913). These three future Presidents all left Charing Cross Hospital in 1877 or 1878 ; Powell was elected assistant physician to the Middlesex Hospital on 11 July, 1878, physician on 10 November, 1880, and consulting physician on 22 February, 1900. For thirty years he taught students, beginning in 1871 as lecturer on materia medica at

Charing Cross Hospital, and holding various lectureships on medicine at the Middlesex Hospital during his time on the active staff. In the wards he was stimulating to the thoughtful student rather than a source of dogmatic answers to candidates whose vision was confined to the problem of satisfying the examiners. With a sound basis of morbid anatomy he became a great clinician, full of practical lore but ever ready to adopt what was true as well as, though not because it was, new.

He was attached to the Court for thirty-eight years, being appointed physician extra-ordinary to Queen Victoria in 1887 on the death of Wilson Fox, whom in some respects he much resembled, physician-in-ordinary in succession to Sir William Jenner in 1899, and held the same office under King Edward VII and His present Majesty, and thus resembled our founder, Linacre, in being physician to three sovereigns. Together with Sir Thomas Barlow and Sir James Reid he was in attendance on Queen Victoria in her fatal illness in January, 1901, and also on King Edward in his last illness in 1910. His first professional house was next door to Sir Thomas Watson in Henrietta Street, where, although not entirely escaping the lean years of young consulting physicians, he became successful comparatively early in professional life as an authority on diseases of the heart and lungs, in virtue of his solid attainments gained by much clinical and pathological experience. A hard and constant worker, he wrote much in current literature, but always judicially and with wise caution. His first article on "Displacement of the Heart" appeared in 1869, and a posthumous article on "Blood Pressure in Diagnosis" appeared in the January number of this year's *Practitioner,* so that his output extended over fifty-six years. The articles on aneurysm of the thoracic aorta and mediastinal tumours in Russell Reynolds' *System of Medicine* (1879, Vol. v) and in its successor, Allbutt's *System of Medicine* (1898–9 and 1909), on diseases of the myocardium and angina pectoris bear witness to his position as a recognised expert on thoracic disease. His main work was *On the Principal Varieties of Pulmonary Tuberculosis with Practical Comments on Diagnosis, Prognosis and Treatment* (1872, pp. 97) which with modifications in its title, such as *On Consumption and on Certain Diseases of the Lungs* (1875), *On Diseases*

of the Lungs and Pleuræ, including Consumption (1886), and *On Diseases of the Lungs and Pleuræ, including Tuberculosis and Mediastinal Growths* (1911, in collaboration with Sir Percival H.-S. Hartley), went through six editions, the last in 1921, with 798 pages.

In the medical life of London he was long a prominent figure ; to the old Pathological Society of London, of which he was Secretary in 1877–9 and Vice-President in 1887–8, he made twenty-nine contributions ; in the *Transactions* of the Clinical Society of London, of which he was Vice-President (1889–90) and President (1899–1901), there are four papers from his pen ; the Royal Medical and Chirurgical Society, of which he was Secretary (1883–6), Vice-President (1902–4), and President (1904–6), printed in the *Transactions* four of his papers, including the important one on the physics of the chest (1875) ; and at the Medical Society of London he was Vice-President (1884–85), President (1891), Orator (1886), and introduced discussions, such as those on angina and the action of medicinal and other remedies in cardiac failure. He was President of the Royal Medical and Chirurgical Society in its centenary year and in the chair at the celebration and banquet attended by the Prince of Wales and 454 Fellows and guests on 22 May, 1905. He took a very active part in the long and arduous process of amalgamating the seventeen separate societies with the Royal Medical and Chirurgical Society into the Royal Society of Medicine ; it was to him that the late Sir John MacAlister submitted the revised scheme for the amalgamation, and but for his hearty approval it might have failed as previous attempts had done. Another important movement which owed much to his help in its initiation was the Association of Physicians of Great Britain and Ireland, which, suggested by Sir William Osler, had its first meeting in London on 23 and 24 May, 1907, in the house of the Royal Medical and Chirurgical Society under the Presidency of Sir Richard. He was Deputy Chairman of the Clerical, Medical and General Life Assurance Society in which he had taken an active part for many years. With the Conservative and Unionist Association of the University of London he was closely associated for more than thirty years, and from 1909 to 1919 was its President.

Many honours rightly came to him ; he was created a Baronet in 1897 and a K.C.V.O. in 1901. Oxford made him an honorary D.Sc. in 1907, Dublin and the Royal University of Ireland an M.D. in 1905, and the Royal College of Physicians of Ireland an honorary Fellow (1905), Aberdeen (1906) and Birmingham (1909) conferred the LL.D. on him during his Presidency of this College. At this College, which he greatly adorned, he became a Member in 1867 and a Fellow in 1873, served as Councillor (1892–4 ; 1902), Censor (1898, 1899 and 1902), and was elected President on five occasions (1905–1909). He also delivered the Lumleian Lectures for 1898 " On the Principles which Govern Treatment in Diseases and Disorders of the Heart," which were afterwards expanded into a book, and in 1914 the Harveian Oration on " Advances in Knowledge regarding the Circulation and Attributes of the Blood since Harvey's Time."

Powell was a striking personality, tall, thin with a refined pallor, a charm of voice, and the courtly manner that conveys the respect due both to others and himself. His was a dignity that becomes a leader, and the reserve that accompanies culture. He was master of himself and so became fitted to direct others. Always reticent, correct, cautious and shrewd, he combined wise tact with a high ideal of his calling and a kind heart, and, as shown by his appointments, was widely recognized as a leader.

RICHARD CATON.

With the death of Richard Caton on 2 January, 1926, there passes behind the veil a physician of high standing and scholarly attainment, and an able man of affairs. For six months his health had been poor and his activities impaired by sciatica ; he had thus been unable to attend the November session of the General Medical Council and a few weeks before his death went to Haslemere to escape the rigors of the northern climate. He was the son of Richard Caton, M.A., M.D., of Bradford, and Mary Fawcett, and was born at Bradford on 26 July, 1842, coming of a Lancashire family of Haysham and Caton.

At Scarborough Grammar School he acquired that love of classics which he cultivated throughout life,

as evidenced by his travels in Greece, his membership of the Hellenic Society and chairmanship of the Liverpool branch of the Classical Society. In 1863 he went to Edinburgh and in 1867 qualified M.B., C.M., proceeding in 1870 to the degree of M.D. with a gold medal for a thesis on the migration of leucocytes. In later years he was an examiner in his old University and received from her the honorary LL.D. in 1908. He settled in Liverpool in 1868 and in the early 'seventies worked on cerebral localization. In 1882 he was appointed Professor of Physiology in University College, Liverpool, and after relinquishing it in 1891, was elected Emeritus Professor of Physiology in the University of Liverpool when this was established in 1903. He was Dean of the Medical Faculty in 1875, and took a very active part in the promotion of university education in Liverpool, his work being rightly recognised by the honorary degree of LL.D. (1909), the life Governorship of University College, and by his election as Pro-Vice-Chancellor of the University of Liverpool (1921–1924) ; in this last capacity he represented the University at the celebration of the seven-hundredth anniversary of the foundation of the University of Padua, and received the degree of Doctor *honoris causâ*. University College, Liverpool, established by charter on 18 October, 1881, and opened on 7 January, 1882, was due to the exertions of public spirited men, among whom Dr. Caton was prominent ; it was affiliated to the Victoria University of Manchester on 5 November, 1884, and in 1903, when the separate University of Liverpool came into being, was merged therein. He was also Vice-Chairman of the Liverpool School of Tropical Medicine, and represented the University of Liverpool on the General Medical Council from 1 January, 1904, until his death, thus being its first and so far only representative. He was honorary physician to the David Lewis Northern Hospital from 1876 to 1886, when he was appointed to a similar post at the Royal Infirmary, Liverpool, which he held until 1902, when he became consulting physician. In 1920 he was President of the Royal Infirmary. He was Vice-President (1881) and President (1896) of the Liverpool Medical Institution, and on 27 February, 1919, the jubilee of his membership of that body, was enthusiastically celebrated.

In civic affairs Dr. Caton played a very prominent part, being Chairman of the Liverpool Committee for the Housing of the Poor and of the Secondary Education Committee, Vice-Chairman of the Liverpool Cathedral Executive Committee, and Lord Mayor of Liverpool in 1907 to 1908. During the War he was honorary Colonel, West Lancashire Division, R.A.M.C., and in March, 1920, received the C.B.E. in recognition of his work as Chairman of the Nursing Service Committee (Liverpool branch), British Red Cross Society.

At this College Dr. Caton became a Member in 1878, and Fellow in 1888 ; he served on the Council (1911–1913), and in 1904 delivered the Harveian Oration on "I-em-hotep and Ancient Egyptian Medicine, and on the Prevention of Valvular Disease." His publications fall into two groups, of which the most important are those dealing with Ancient Greek Health Temples, such as his Harveian Oration, "Two Lectures on the Temples and Ritual of Asklepios at Epidaurus and Athens" (Bibliography and illustrated, Liverpool, 1899) ; a lecture on 2 March, 1906, at the Royal Institution of Great Britain "On Hippocrates and the Newly-discovered Health Temple at Cos" (*Brit. Med. Journ.*, 1906, i, 571), "The Temples, Hospital and Medical School of Cos" (*Trans. XVIIth Internat. Congr.*, 1913, London, 1914, Sect. xxiii, 19–23), a lecture at the Archæological Institute of the University of Liverpool in 1907 on "The Gods of Healing of the Egyptians and Greeks," and papers on "Health Temples of Ancient Greece and Work carried on in them," and (with W. H. Buckler) "Account of a Group of Medical and Surgical Instruments found at Kolopon" (*Proc. Roy. Soc. Med.*, 1913, vii (*Hist. Med. Sect.*), 57–70 ; 235–242). His more medical contributions include "Physiology in Relation to the Health of the People" (1873), "Municipalities and Infant Life" (*Pediat.*, N.Y., 1914, xxvi, 75). The article "On the Prevention of Valvular Disease in Acute Rheumatism" (*Trans. Clin. Soc. London*, 1900, xxxiii, 127–139), and a clinical lecture on the same subject (*Brit. Med. Journ.*, 1900, ii, 1156) were expanded into book form, *The Prevention of Valvular Disease of the Heart : A Proposal to Check Rheumatic Endocarditis in its Early Stage and thus Prevent the Development of Permanent Organic Disease of the Valves* (pp. 92, London, 1900) ;

he recorded eighty-six cases, and in addition to rest in bed, salicylates and alkalis, laid stress on the administration of sodium iodide and the application of small blisters over the cardiac area. He also wrote on "Aneurysm of the Hepatic Artery" (*Trans. Clin. Soc. London,* 1886, xix, 275), and on "Narcolepsy" (*ibid.,* 1889, xxii, 133), and rheumatic endocarditis (*Lancet,* 1902, ii, 499). The new heart hospital shortly to be opened in Liverpool naturally had his enthusiastic support.

A man with broad interests and with a high sense of public duty, a shrewd knowledge of human nature, the saving graces of kindly humour, geniality and unostentatious generosity, he was much beloved and "made belief in goodness possible for other men."

EDWARD GRANVILLE BROWNE.

On 5 January pneumonia, supervening on other morbid conditions of some duration, brought to a close the life-work of that phenomenal scholar, Professor E. G. Browne. His health had been precarious for some time, and the loss of his wife on 28 June last was really his death sentence. Though never in practice, he attached great value to the experience gained, when a medical student, of human life and its mysteries, which did more than anything else to strengthen his faith in the nobility and virtue of the spirit of man in the misery of its earthy surroundings; he also expressed his debt to its valuable training in observation and to "that fine tradition of learning, acumen and humanity proper in all countries and ages to the great profession of medicine."

Born on 7 February, 1862, at Uley, near Dursley, in Gloucestershire, he was the eldest son of the late Sir Benjamin Chapman Browne, a member of the engineering and shipping firm of Hawthorne, Leslie and Co., Newcastle-on-Tyne, who was Lord Mayor of that city (1885–87), and, being largely responsible for the success of the Royal Jubilee Exhibition and Royal Agricultural Show there in 1887, received the honour of knighthood. His mother, who survives her son, was Annie, the daughter of Robert Thomas Atkinson, of Benwell, Newcastle-on-Tyne, a mining engineer. On both sides there was a hereditary

love of music, which was perhaps responsible for our late Fellow's fine ear for language, which he learnt more by this method than by grammatical or philological approach. His great-grandfather on the father's side was William Sharp (1729–1810), surgeon to George III, and the grandson of John Sharp (1645–1714), Dean of Canterbury and Archbishop of York. William Sharp's mother was Judith, daughter of Sir George Wheler, the traveller, who, with his son, Granville, are noticed in the *Dictionary of National Biography*. William Sharp of Old Jewry and later of Fulham, was keenly interested in music, as were his brothers James and Granville. The latter (1735–1813) was associated with Clarkson and Wilberforce in the anti-slavery campaign, and was intensely interested in religions and singing the psalms in Hebrew to the harp. Our late Fellow went to Glenalmond and then to Eton, but his experience was not happy, and in his autobiographical answer to the question so often put to him, " What first made you take up Persian ? " he wrote : " The most wretched day of my life, except the day when I left college, was the day I went to school. During the earlier portion of my school life I believe that I nearly fathomed the possibilities of human misery and despair " (*A Year among the Persians*, p. 7, 1893). Originally destined to be an engineer, he left school at the early age of 15½ years, partly, at any rate, because the teaching of " the modern side " was then rudimentary.

The Russo-Turkish War in 1877 first directed his attention to the East, and he became such an ardent admirer of the Turks that his whole ambition was centred on becoming an officer in their army, and with this object he plunged with enthusiasm into the language. But his father, who did not think him suited for the army, proposed medicine as an alternative to engineering, and as this seemed more compatible with his aspirations, he went up in October, 1879, to Pembroke College, Cambridge, and thus began a " new and most happy era of life." He at once studied Arabic under the late Professor E. H. Palmer, the Lord Almoner's Professor of Arabic, thus learning more of Arabic in one term than he had of Latin and Greek during five and a half years, and in the long vacation of 1880 he started Persian. In June, 1882, he was placed in the second class of the Natural

Sciences Tripos, Part I, and in July went for two months to Constantinople as a paternal award for passing this and the second M.B. The two succeeding years at Cambridge were a period of undiluted pleasure, for his whole time could now be devoted to oriental languages, and as a result his name was the only one in the first class of the Indian Languages Tripos, which included Persian as well as Hindustani, a language from which he "never succeeded in deriving much pleasure." He then returned to medicine and on entering St. Bartholomew's Hospital in October, 1884, came under the influence of Sir (then Dr.) Norman Moore, to whom, when President of this College, he dedicated his FitzPatrick Lectures (1919–20) on Arabian medicine "in gratitude for his inspiring teaching, and in memory of three fruitful years passed under his guidance." In 1887 he proceeded to the M.B. degree at Cambridge and took the Conjoint Board qualification. His hopes that a knowledge of Persian, Arabic and Turkish might gain him a post in the Consular Service, and so enable him to visit Persia, were damped by curt official letters. But suddenly the future brightened, for on 30 May, 1887, he found a telegram awaiting him and on opening it with indifference found to his "ecstatic joy" that he had been elected a Fellow of Pembroke College, Cambridge—a society of which he became President in 1912. It had been arranged that he should come on as house-physician for a year from 1 April, 1888, for Dr. Samuel Gee; but in September, 1887, he went to Persia and did not return until October, 1888, when he went into residence at Cambridge, where in the previous May he had been appointed the first holder of the lectureship in Persian. Accordingly the late Dr. W. H. R. Rivers took his place as house-physician, and, as fate decided, followed him, though in another capacity, to Cambridge, where he, too, made a great name.

In 1902, in succession to C. P. H. Rieu, Browne was elected Sir Thomas Adams's Professor of Arabic, and holding this post until his death, was extraordinarily successful as a teacher of Arabic and Persian. His rooms in Pembroke, where Thomas Gray, the poet, and William Pitt, the younger, lodged in the eighteenth century, were the headquarters of the school of living oriental languages which he organized in connection with the

Sudan Political Service and the Consular Department of the Foreign Office. His sympathetic influence over oriental students was unrivalled, and he provided a second home to Pembroke men who were attracted by the man even more than by the brilliant scholar. Though he concealed it, he was a most generous benefactor, and by his generosity to men out of work did much for the Botanic Gardens at Cambridge. In 1903 he became a Fellow of the British Academy, and in April, 1911, he was the first to be elected a Fellow of our College under Bye-law XL (*b*) ; this is an honour carefully considered, and of the thirteen elected in fifteen years, ten are Fellows of the Royal Society ; Browne is the first to leave us, but it is pleasent to learn that of his many distinctions few, if any, gave him so much real pleasure. The FitzPatrick Lectures, delivered before the College, in which Arabian medicine was for the first time treated in this country (Cambridge University Press, 1921), were his main but not his only medical contribution, for in January, 1897, he gave as the mid-sessional address at the Abernethian Society of St. Bartholomew's Hospital " A chapter from the history of cannabis indica," containing much that was interesting about the Assassins and their victims (*St. Bartholomew's Hosp. Journ.*, 1896–97, iv, 81).

His contributions to the literature of oriental history and religion were numerous and of a very high order. His great work on Persian literature in four volumes (1902–24) is regarded as beyond comparison the outstanding authority, and contains many admirable renderings of oriental poetry into English verse. His translation of the Chahár Maquala (" Four Discourses ") (1889) has the special interest that it contains the only contemporary account of Omar Khayyám. He also performed a great service in the various accounts of Bábiism he published, data for which be obtained after surmounting great difficulties. Among his other works are *A Year Among the Persians : Impressions as to the Life, Character and Thought of the People of Persia, received during Twelve Months' Residence in that Country in the Years* 1887–8 ; *The Persian Revolution of* 1905–1909, showing his deep sympathy with the Persian reformers, and vigorous detestation of the Russian policy ; *An Abridged Translation of the History of Tabaristán,* 1905 ; and

catalogues of Persian and Mohammedan manuscripts. With characteristic unselfishness he completed and saw through the press E. J. W. Gibb's *History of Ottoman Poetry,* of which one volume only of the five was seen by the original author. As a like labour of love he also administered the "E. J. W. Gibb Memorial" which, since its establishment in 1904, has brought out thirty volumes of the texts and translations of oriental works. As a master of English style his travels are fascinatingly told; he records, like a second De Quincey, how in 1888, from force of circumstance, he temporarily took to opium smoking in Persia. In February, 1921, on the occasion of his fifty-ninth birthday, he received a complimentary address (accompanied by very beautiful presents) signed by a number of representative Persians, expressing their appreciation of his services to their language and literature. Letters expressing their sense of the loss Persian letters and nationalism had sustained by his death were received in January by the Vice-Chancellor of Cambridge from Abdullah Mostoufie, President, and Foroughi, Prime Minister of Persia; and messages recalling his eminent services to oriental learning were sent by the Rector of the University of Constantinople, and by His Majesty's Principal Secretary for Foreign Affairs, Sir Austen Chamberlain.

GEORGE HERBERT HUNT.

It is difficult to estimate the loss to British Medicine by the early death of young men actively engaged in teaching and research and with a record of good work already behind them. But in the case of George Herbert Hunt, who succumbed to recurrent malignant disease on 9 January, 1926, there is every reason to believe that it must be very serious.

He was the eldest child and only son of George Stratford Hunt, merchant, of Sandfield, Chislehurst, and Adeline Mary, daughter of Dr. Harvey Williams, of Oswestry. He had four sisters, and his paternal aunt was the wife of our former Fellow, the late George Oliver, of Harrogate. Born at Chislehurst on 9 April, 1884, he was educated at Rugby (May, 1898–April, 1902) and then went up in

October, 1902, to Christ Church, Oxford, where, in 1906, he was placed in the second class in the School of Natural Science, taking physiology. Here he began research work in the estimation of the nitrogen excretion in a healthy man who had undergone nephrectomy after an accident. Sir William Osler, recognizing that character is more important than academic success, predicted a high place in medicine for Hunt before he went up to Guy's.

Entering the Medical School of Guy's Hospital in October, 1907, he qualified with B.M., B.Ch., Oxford, proceeding to the D.M. in 1914, and after a brilliant career as a student was in due course appointed medical registrar and assistant pathologist (October, 1911), assistant physician (1913), and physician (March, 1925). From its establishment in 1913 he had been physician in charge of the Massage Department, to which during 1925 there were 3,800 new admissions, and had written papers on massage and remedial exercises in various forms of disease in the *Guy's Hospital Reports*; the last, dealing with pulmonary and pleural affections, appeared as recently as October, 1925. When house physician in 1911 he published a paper on the treatment of syphilitic disease of the central nervous system by salvarsan, then just introduced into this country.

His attention was early directed to the aspects of the new cardiology, as shown by various papers on the prognosis of extra-systoles (*Proc. Roy. Soc. Med.*, 1913, vi (Clin. Sect.), 222), observations on paroxysmal tachycardia (*Quart. Journ. Med.*, Oxford, 1913–14, vii, 209), and other forms of cardiac irregularity in the *Guy's Hospital Gazette*. During the War he served in France (1914–16), being mentioned in dispatches in 1915, in which year he and A. C. Rankin described, and for the first time employed the name, "trench fever" (*Lancet*, 1915, ii, 1369). In 1916 he was transferred to the Royal Military Hospital, Devonport, and in 1917 to the Royal Victoria Hospital, Netley, where he organized a department for physical training of men with disordered action of the heart. From 1917 to 1919 he carried out important work with Professor J. Barcroft in the Cambridge and Porton laboratories on the problems of gas-poisoning, and contributed in 1918 to the Reports of the Chemical

Warfare Medical Committee, Medical Research Committee, papers " On the Effects of Gas Poisoning on the Heart Sounds and Pulse Rate in Goats," and " The Treatment of Chronic Cases of Gas Poisoning by continuous Oxygen Administration in Chambers." After the Armistice these lines of research were continued at Guy's Hospital in connection with the use of oxygen in cardiac and pulmonary diseases, and he was the Secretary of the Medical Research Council's Investigation Committee on the Clinical Uses of Oxgyen. The results of tonsillectomy in the acute rheumatism of children also attracted his attention (*Guy's Hosp. Rep.*, 1924, lxxiii, 383), and quite recently he was much interested in the surgical treatment of angina pectoris. His students have lost a teacher with high ideals and a remarkable gift of imparting knowledge.

Outside his profession he had several interests, especially in music, being specially gifted in reading difficult music at first sight, and much in demand as a viola player and as a tenor. At lawn tennis and golf he was considerably above the average. He had a gentle, lovable disposition and his friends will long cherish his memory.

* * * *

I have now enjoyed the high honour of the Presidency of this College for four years, and, although most reluctant to resign a position of such distinction and trust, there are many reasons, obvious alike to you and to me, why I must ask you not to vote for my re-election. In finally leaving this position I would express my most heartfelt gratitude to the Fellows, not only for this mark of confidence but for uniform and loyal support, to the Censors' Board for wise counsel, and especially to the College Officers for indispensable help and constant consideration ; to Mr. H. M. Barlow, Bedell and Secretary, and to Mr. William J. Bishop, the Clerk and Library Assistant, I am much indebted for their indefatigable services.

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ALCOHOLISM IN CLASSICAL ANTIQUITY

BY

J. D. ROLLESTON
M.A., M.D., M.R.C.P., F.S.A.

HOUSE OF LORDS,
S.W.

6th Feb. 1930.

My dear Rolleston,

Let me thank you very much for your kindness in sending me this little booklet, which I am sure will interest me. It seems to be a bridge between our meeting last Monday and those glorious days at Marlborough.

I wonder how your words will appeal to one who is a total abstainer & yet loves the classics and Pindar, whom I am glad to see you quote that as saying in "Water is best." You may remember my constant regret that so much time and beauty of Horace seems squandered on his drinks.

I am so really glad to have had the chance of seeing you again after these years.

With best remembrances,

Yours very sincerely,

B. Norris

J.D. Rolleston, Esq., M.D.

ALCOHOLISM IN CLASSICAL ANTIQUITY.*

By J. D. ROLLESTON,

M.A., M.D., M.R.C.P., F.S.A.,

Ex-President, Section of the History of Medicine, Royal Society ot Medicine ; Medical Superintendent, Western Hospital, London.

The history of inebriety is so intimately connected with civilization that, when I was asked by our Secretary to read a paper on some historical aspects of alcoholism, I thought I could not choose a more interesting subject than the references to alcoholism in the literature of ancient Greece and Rome, especially as it is nearly thirty years since the subject of inebriety in ancient times was brought before this Society, when Dr. W. L. Brown, on January 13, 1898, delivered an address entitled "Inebriety and its Cures among the Ancients." I accepted the invitation all the more readily as I had paid some attention to the subject in my previous studies of medicine in classical literature.

SOURCES OF INFORMATION.

In view of the fact that the scientific study of inebriety dates only from the middle of the nineteenth century, it will not be surprising to learn that very little is to be gleaned from contemporary medical writers as to the prevalence and effects of alcoholism in classical antiquity. Our chief sources of information are the poets, especially the gnomic writers, such as Theognis ; the satirists, including Horace, Juvenal, Martial, Lucian, and the "Greek Anthology," philosophers and moralists such as Plato,

* A paper read before the Society for the Study of Inebriety at the Autumn Meeting of the Society, held in the rooms of the Medical Society of London, 11, Chandos Street, Cavendish Square, W. 1, on Tuesday, October 12, 1926, Sir William Willcox, President, in the chair.

Plutarch and Seneca, and, most of all, the two encyclopædic writers, Pliny the Elder and Athenæus.*

The present paper, therefore, like Beveryk's "Idea Medicinæ Veterum" (1637), will be based almost entirely on the study of the lay writers of antiquity.

Pliny the Elder (*fl.* A.D. 23-79), who, as an adherent of the Stoic philosophy, constantly inveighs against the luxury and corruption of his age, devotes an eloquent chapter to the subject of drunkenness ("Hist. Nat.," XIV., c. 28), as well as many others to the different varieties of wine (*ibid.*, c. 6-27) and their therapeutic uses (*ibid.*, XXIII., c. 19-26). Numerous supposed remedies for the prevention or cure of inebriety will also be found in his pages.

Athenæus was a native of Naucratis, a Greek settlement at the mouth of the Nile, who flourished at about the end of the second and beginning of the third century A.D., and was the author of a work entitled "The Deipnosophists," or dinner-table philosophers, which has been described by Mr. George Saintsbury ("A History of Criticism," 1908, i., p. 144, note) as "the most enormous miscellany of quotation, anecdote, and *quodlibeta* in ancient, if not in all, literature." The work consists of fifteen books, of which the first, second, and parts of the third, eleventh, and fifteenth exist only in epitome. According to Allbutt, Athenæus of Naucratis, who is to be distinguished from the physician Athenæus of Pamphylia, the founder of methodism, owes the medical portion of his work, in which he quotes about seven hundred writers, to the Symposium of Heracleides of Tarentum (*fl.* 160-110 B.C.), to whom Celsus was also indebted.

Athenæus† is of special interest to the medical reader in that he has preserved fragments which have not otherwise come down to us of medical and lay works on inebriety. In addition to references to the writings of Hippocrates (II., c. 24), Galen (I., c. 48), and a celebrated Athenian physician named Mnesitheus (I., c. 41, 59; II., c. 2; XI., c. 67), he makes several quotations from lost works by Aristotle (II., c. 22; X., c. 34, 67; XI., c. 11, 96; XIV., c. 47, 48), and his disciples Theophrastus (X. c. 22, 24, 30; XI., c. 8, 13, 97; XV., c. 48) and Chameleon of Heraclea (X., c. 29; XI., c. 4) on drunkenness, as well as from plays by Menander on drunkenness (VI., c. 42), and

* It is significant that on more than one occasion Galen ("Quod animi mores corporis temperamenta sequantur," III., § 448, 458, X. 457) quotes from Theognis and Plato in the few references which he makes to inebriety.

† The references to Athenæus are to the English translation in Bohn's Classical Library by C. D. Yonge.

by Alexis on the Wine-Bibber (VI., c. 45). He also supplies us with the surprising information (I., c. 5) that Aristotle wrote drinking songs.

The subject of wine, drinkers, and inebriety bulks largely in "The Deipnosophists," as is shown by the fact that, in addition to scattered allusions elsewhere throughout the work, fourteen chapters (47-60) in the first book are devoted to a discussion of the varieties of wines, six chapters (2-7) in the epitomized second book to the evils of drink, and the following four (8-11) to the praise of wine, while nearly fifty chapters (21-68) in the tenth book deal with the mixing of wine, cupbearers, the evils of drunkenness, celebrated drinkers, and cognate subjects, and almost all the eleventh book with the varieties of drinking cups.

Among other classical writers who discuss inebriety, special mention must be made of the Stoic philosopher Lucius Annæus Seneca (*fl.* 3 B.C.-A.D. 65), who, as Magnus Huss has pointed out in his classical work, has left a remarkable description of chronic alcoholism.

PREVALENCE OF ALCOHOLISM IN CLASSICAL ANTIQUITY.

Some idea of the prevalence of drinking in classical antiquity may be gained from the great variety of wines mentioned by Pliny and Athenæus. Pliny alludes to 116 different sorts of wine, of which fifty were called "generous," and the list given by Athenæus includes thirty-five varieties of Italian wine, in addition to the wines of Greece, Asia Minor, and Alexandria. Among the Greeks the largest quantity of wine came from the Ægean islands of Thasos, Samos, Lesbos, Cos, and Chios, while among the Romans the most celebrated wines were the Falernian, Cæcuban, Alban, and Surrentine wines familiar to readers of Horace. Certain wines were looked upon with disfavour, such as Pramnian wine, described as dry and hard (Athen., I., c. 55), Corinthian wine, which was harsh (*id.*, c. 56), and the wine called "abates" from Cicilia, which had no effect beyond that of relaxing the bowels (*id.*, c. 59). The use of beer in Egypt, Armenia, Germany, Spain, and Gaul, under various names such as *οἶνος ἐξ κριθέων* (Herodotus, II., c. 77), *οἶνος κρίθινος* (Xenophon, "Anabasis," IV. 5, 26), *βρύτος* (Athen., X., c. 67), *xythum* (Plin., "Hist. Nat.," XXII., 82), *cosma* (Athen., IV., c. 36), *Πῖνος* (*id.*, X., c. 67), *humor ex hordeo* (Tacitus, "De Moribus Germaniæ," c. 23), *cerevisia* or *celia* (Plin., "Hist. Nat.," XXII. 82), appears to be almost as old as that of wine, though it was generally despised as a barbarian drink by the Greeks and Romans. Athenæus (X., c. 67) quotes a passage from Aristotle's lost work on drunkenness to the effect that those who get drunk on beer

fall on their faces, whereas those who get drunk on other intoxicating liquors fall on all parts of their body. Athenæus (*ibid.*) also illustrates the intoxicating effect of beer by the following lines from a lost play of Æschylus entitled "Lycurgus":

> "And after this he drank his beer, and much
> And loudly bragged in that most valiant house."

The great variety of drinking vessels in use in ancient Greece and Rome, of which the British Museum offers such a fine display, testifies to the important part which drinking played in the everyday life of antiquity. Athenæus devotes nearly seventy chapters (XI., c. 11-79) to a description in alphabetical order of about a hundred drinking cups of various forms and sizes, which were made of earthenware, gold, silver, wood, or horn, the commonest being the cylix, a broad cup raised upon a foot, the phiala, a kind of saucer, the cantharus, a narrower and deeper vessel, and the horn-shaped rhyton. It is noteworthy that some of these drinking cups had obscene designs engraved upon them, "as if," says Pliny ("Hist. Nat.," XIV., c. 28), "drunkenness itself was not a sufficient stimulus to lust."

The proverbial philosophy of the ancients dealing with the subject of drunkenness, of which *in vino veritas* and its Greek equivalents (Athen., II., c. 6) are the best-known examples, is further evidence of the prevalence of inebriety in ancient times. It is significant in this connection that three of the seven wise men of Greece—namely, Anacharsis, Pittacus, and Solon, left sayings or enacted laws relating to inebriety. According to Diogenes Laertius (I. viii. 5), Anacharsis used to say that the vine bore three branches—the first of pleasure, the second of drunkenness, and the third of remorse. Athenæus (X., c. 31) relates that Pittacus recommended Periander of Pirene not to get drunk in case he should reveal what sort of man he really was, wine being a mirror of the soul, just as brass is of the face. Pittacus is also credited (Diog. Laert., I. iv. 3; Aristotle, "Pol.," II. 12) with having made a law that offences committed by a man when drunk should have a double penalty. "He looked not," says Aristotle, "to the excuse which might be offered for the drunkard, but only to expediency, for drunken more often than sober people commit acts of violence" (Jowett's translation, p. 99).

Solon appears to have been even more severe, as he enacted that if an archon was found intoxicated he should be put to death (Diog. Lært., I. ix. 57).

The following utterances concerning drunkenness are ascribed to Pythagoras, who, though he was not ranked as one of the

seven wise men of Greece, stands high in the hierarchy of early Greek philosophers. The first is the proverb of the three branches of the vine, which is also attributed to Anacharsis; the second is that the best way to avoid drunkenness is to consider the shameful acts committed while drunk; the third is that drunkenness is a training for madness; and the fourth that drunkenness is identical with ruin. (The first three sayings are to be found in Stobæus, Sermo LXXXVIII., and the fourth in Diogenes Laertius, VIII. 6.)

There are many Greek equivalents for the familiar proverb alluded to by Pliny ("Hist. Nat.," XIV., c. 28), of truth being in wine, of which the following may be quoted:

"By fire one tests gold and silver, and by wine one learns the character of a man."—Theognis, 499.

"Wine is the touchstone of character."—"Anth. Pal.," XI. 232 (Callias).

"Wine lays bare the heart of man."—Athen., II., c. 6.

"Insolence and wine reveal to men the character of their friends."—Epictetus, quoted by Stobæus, Sermo LXXXVIII., "De Ebrietate."

The numerous synonyms for an inebriated or bibulous person both in Greek and in Latin, though not equal to those found in the English language, in which, according to the 1925 edition of Roget's "Thesaurus," there are about seventy, may also be brought forward as an indication of the prevalence of inebriety in antiquity. Thus in Latin we have the words *bibax*, *bibulus*, *ebriosus*, *ebrius*, *fortunatus*, *madidus*, *potulentus*, *potus*, *temulentus*, *uvidus*, and *vinosus*; while in Greek the vocabulary is even more abundant—namely, ἀρρυθμοποτής, ἔξοινος, μέθυσος, μεθυστικός, μεθύων, οἰνόληπτος, οἰνομάνης, οἰνόφλυξ, οἰνώδης, πάροινος, πολύοινος, πότικος, φίλοινος, φιλοκωθωνιστής, φιλοπότης.

ALCOHOLISM IN ANCIENT GREECE.

In Greece the origin of alcoholism can be traced back to the mythical age. The demigod Dionysos, who was credited with the discovery of wine, was said to have travelled in Egypt, Syria, and parts of Asia, and to have introduced the manufacture of wine along with the other arts of civilization into Greece, where he was deified after his return from his wanderings, and festivals were celebrated in his honour under the name of Dionysia. Among the Greeks there appears to have been a tendency to represent drunkenness (Μέθη) as a goddess or demigoddess. Pausanias (II., c. 27) relates that in the Rotunda (*Tholos*) in the sacred grove of Æsculapius at Epidaurus is a painting by Pausias representing Drunkenness drinking out of a goblet. "In the picture," says he, "you can see the crystal

goblet and the woman's face through it" (J. G. Frazer's translation, vol. i., p. 112). In another passage (VI., c. 24) Pausanias states that in a temple of Silenus at Elis Drunkenness is represented giving him wine in a cup. There is also an epigram in the "Greek Anthology" ("Anth. Pal.," VII. 752) attributed to Asclepiades or Antipater describing the image of Drunkenness engraved on a ring, and running as follows: "I am Drunkenness, the work of a cunning hand, and it is on an amethyst that I am engraved. The stone is strange to the subject; but I belong to Cleopatra, and on the hand of a queen even a drunken goddess must be sober."

Habitual drunkenness was exceptional among the Greeks, but occasional intoxication at banquets and the Dionysia was not uncommon. Even Plato ("Leg.," VI. 775) was of opinion that a man ought to become intoxicated at the Dionysia. Lucian ("De Cal. non tem. cred.," 16) illustrates the danger of abstinence at this time by the case of the philosopher Demetrius, who was accused before Ptolemy of drinking water at this festival, and only saved his life by being drunk from an early hour in the morning.

Total abstinence, though rare, was not unknown in ancient times either among the Greeks and Romans or the barbarians. The Lacedæmonians at one time were teetotallers, and their practice of making the helots drunk was carried out to inculcate on the youth of their country a disgust for drunkenness owing to the revolting behaviour of these slaves while under the influence of drink (Plutarch, "Life of Lycurgus"). According to Lucian ("Cynicus," 5) the Cynic philosophers also abstained from wine, and drank water "just like animals." Athenæus devotes two chapters (II., c. 21, 22) to an account of nine well-known water-drinkers, and relates that for a considerable time Demosthenes the orator drank nothing but water. Cæsar says that the Nervii ("De Bello Gallico," II. xv. 4) and the Suebi (*ibid.*, IV. ii. 6) forbade the importation of wine through fear it should make them effeminate. Temporary abstention from wine during training is mentioned by Horace in a well-known passage ("Ars Poetica," 414). Water-drinkers, however, in spite of Pindar's celebrated line, Ἄριστον μὲν ὕδωρ ("Olymp.," I. 1), were generally regarded with much dislike, especially by the poets, as we learn from the writers in the "Greek Anthology" (IX. 305, 406; XI. 429; XIII. 29), Horace ("Od.," I. xviii. 3; "Epist.," I. xviii. 91, I. xix. 1), and Martial (II. 50; VI. 69, 86; XI. 104; XII. 30). Martial, for instance, mentions water-drinking as one of the many causes of incompatibility between himself and his wife (XII. 30); and it is

probable that the following lines from the poet Amphis, which recall Luther's couplet ("Athen.," II. 20), received general approval:

There is, I take it, often sense in wine,
And those are stupid who on water dine.

As regards the ages at which wine is suitable, Galen in the "De Sanitate tuenda" (I. cxi.) recommends that boys should abstain from wine as long as possible, as it moistens and heatens the body to excess; and elsewhere ("Quod animi mores corporis temperamenta sequantur," chap. x., 457) quotes with approval a passage from the second book of Plato's "Laws" to the effect that boys up to the age of eighteen should be forbidden wine altogether, and after that age should be allowed it in moderation up to thirty, but should abstain from excess, and not until forty should be allowed to drink freely at banquets in gratitude to the gods, and Dionysos in particular.

The duties of a Greek gentleman as regards wine-drinking are set forth as follows by the poet Simonides: "For neither am I too sober a man, nor am I very intemperate. But whosoever exceeds a measure in drinking is no longer master of his tongue or his mind, and talks recklessly of things disgraceful to the sober, and is ashamed of nothing, though modest when he is sober. Now you, perceiving this, drink not to excess, but either retire before you are drunk—let not your lust compel you like some wretched journeyman—or else stay and do not drink" (J. P. Mahaffy, "Social Life in Greece," 1888, p. 105).

Very similar language is used by the gnomic poet Theognis, whose lines Galen ("Quod animi mores corporis temperamenta sequantur," III. 448) quotes with approval: "To drink much wine is an evil; but if one drink in moderation, wine is not an evil, but a blessing."

Athenæus (XI., c. 16) writes in a like strain: "It is the mark of a gentleman," says he, "to be moderate in the use of wine, not drinking too greedily or drinking large draughts without drawing one's breath, after the fashion of the Thracians, but to mingle conversation with his cups as a sort of wholesome medicine."

On the other hand, Theophrastus ("Characters," XI.) relates of the gross man that he is one who may be seen stopping in front of a barber's or perfumer's shop boasting that he intends to get drunk.

The habitual temperance of the Greeks was shown by the fact that unmixed wine was only drunk in small quantities at the end of dinner in a libation, "which corresponded to grace after meat" (E. A. Gardner), and that otherwise it was usually

taken much diluted. Habitual drinking of pure wine was the sign of a barbarian or a boor, as described by Theophrastus (*ibid.*, IV.). In one of Lucian's satires ("Deorum concilium," 5) the right of Dionysos to sit among the gods is disputed, because, in addition to not being Greek on his mother's side, he smelt of unmixed wine from an early hour in the morning. According to Chameleon of Heraclea, in his work on drunkenness quoted by Athenæus (XI., c. 29), Cleomenes, King of the Spartans, became insane from the habit of drinking unmixed wine, which he had acquired while living with the Scythians.

The dilution of wine took place in a large *crater* or bowl of metal or burnt clay in varying proportions, which were fixed by the master of the feast, and the wine was then ladled out into goblets for the individual guests. The mixture, which was made with hot or cold water or sometimes snow, almost always contained more water than wine. Equal quantities of wine and water were very uncommon, and were regarded as highly intoxicating. The usual proportions were six parts of water to two, three, or four parts of wine. According to Athenæus, who devotes three chapters to the subject (X., cc. 27-29), the proportions varied from half and half to five parts of water to two of wine. The following lines (II., c. 2) are quoted from Mnesitheus, the Athenian physician, on mixing of wine:

"Wine to our daily feasts brings cheerful laughter,
When mix'd with proper quantities of water;
Men saucy get, if one-third wine they quaff,
While downright madness flows from half and half;
And neat wine mind and body too destroys,
While moderation wise secures our joys."

In contrast with the general sobriety of the Greeks, certain contemporary nations, as we learn particularly from Athenæus and Ælian, had gained an evil reputation for the prevalence of drunkenness. Among the most notorious were the Scythians (Athen., X., c. 29), Lydians, Persians, Carthaginians, Celts, Iberians, and Thracians (*id.*, c. 39). Other nations addicted to inebriety mentioned by Athenæus were the Tapyri, a people near Hircania, the Phigaleans, who lived in the Peloponnese, and the Byzantines (*id.*, c. 59). The Macedonians (*id.*, III., c. 92) had so little notion of moderation in drink that they started off at once with enormous draughts before eating, so as to be drunk before the first course was off the table, and to be unable to enjoy the rest of the banquet. In confirmation of Athenæus, Ælian ("Var. Hist.," III. 14) relates that the Byzantines lived in taverns, leaving their houses and wives and letting them to strangers, so that they were at once guilty

of drunkenness and prostitution. Ælian (*ibid.*, III. 15) also states that the Argives and Tirynthians were reproached by the comic poets for their addiction to wine. An epigram in the "Greek Anthology" (Appendix, 199) illustrates the association of lying with drunkenness in the case of a celebrated city in the Peloponnese: "Elis is drunken and lies. As is the house of one, so is the whole city."

In addition to nations notorious for inebriety, special attention was given by some of the ancient writers, such as Pliny ("Hist. Nat.," XIV., c. 28), Ælian ("Var. Hist.," II. 41; XII. 26), and Athenæus, to individuals remarkable for their bibulous propensities. Athenæus devotes no less than eleven chapters (X., c. 44-54) to an account of these persons, some of whom had acquired fame in a more legitimate way, such as Æschylus and Ion among poets, and Darius of Persia, and Philip and Alexander of Macedon among kings, while in others the ability to consume enormous quantities of drink was the only distinction.

In my previous papers on medicine in the "Greek Anthology" and in Lucian I drew attention to the fact that many of the contemporary philosophers served as models of intemperance, there being a striking variance between their precepts of sobriety and their practice.

ALCOHOLISM IN ANCIENT ROME.

In ancient Rome the Greek custom was adopted of choosing by a cast of the dice a master of the feast (*magister*, or *rex convivii*, or *arbiter bibendi*), who settled how much wine was to be drunk, and in what proportions. The drinking of unmixed wine (*merum bibere*) was considered a sign of intemperance, and even the adding of but little water (*meracius bibere*) was regarded with disapproval (Guhl and Koner). Those who wished to maintain their reputation for moderation used to mix their wine in the proportion of nine ladlefuls (*cyathi*) of water to three of wine.

Gross excess was apparently commoner in the Roman than in the Greek banquet. Cicero ("In Verrem," II. v. 11) compares the end of a banquet given by the notorious Verres to the battle of Cannæ, as some were carried away disabled, while others remained in an unconscious state on the field of battle. It was a common practice at Roman banquets to produce vomiting by introducing a flamingo's feather into the throat, so that more drink and food might be taken; while, to stimulate the appetite for drink, raw onions or powdered pumice stone were eaten (Plin., "Hist. Nat.," XIV., c. 28).

In Rome, as in Greece, the festivals connected with the wine god served as an excuse for widespread intoxication, and finally gave rise to such scandalous excesses as to lead to a decree of the Senate forbidding any Bacchanalia being held in Rome or throughout Italy (Livy, XXXIX. 18).

In addition to the Bacchanalia, other festivals served as an excuse for inebriety, such as the Floralia, or feast of Flora, to which I shall allude later, and the festival of Anna Perenna, held in March, when the lower classes of the population, as Ovid relates ("Fasti," III., 523, *et seq.*), spent the whole day in the Campus Martius, lying about in pairs of men and women, indulging in drinking and revelries of all kinds. The Saturnalia, which were held in December, gave the slaves an opportunity, of which they doubtless availed themselves to the full, of aping their masters' intemperate ways.

It was not, however, until the end of the Republic that drunkenness became widespread in Rome apart from festivals. In the reign of Augustus citizens were seen drunk in the public assemblies (Macrobius, "Saturn.," II. 13), and even magistrates were known to come to the forum in a half-intoxicated condition, and to break the tenor of their business by running to the great wine-jars which the ædiles had put up in quiet corners of the streets (Ferrero).

In the earliest period of Roman history wine seems to have been extremely scarce, for King Numa decreed by the Postumian Law that funeral pyres should not be sprinkled with wine, and forbade the wine which was the product of an unpruned vine to be used as a libation to the gods (Plin., "Hist. Nat.," XIV., c. 14). He also prohibited its use by women (Plutarch, "Lycurgi et Numæ Comp.," III.).

Later, however, wine seems to have become remarkably cheap in Rome. In 250 B.C., for example, it was sold for an as the congius, or for about a penny for three quarts, and in the early Empire the amphora was reckoned at 15 sesterces, that is, nearly six gallons for about eightpence (Warde Fowler).

According to Ælian ("Var. Hist.," II., c. 38), the law was strictly observed that no free woman or female slave in Rome should drink wine. Athenæus (X., c. 58) states that women were only allowed a drink called *passum*, made of raisins. Pliny ("Hist. Nat.," XIV., c. 13) relates that Egnatius Mecennius beat his wife to death because she had drunk some wine from a cask, and was acquitted of murder by Romulus. Another Roman matron, according to the historian Fabius Pictor, whom Pliny quotes, was starved to death by her family for having opened a purse containing the keys of the wine-cellar. Yet another woman

was condemned to lose her dowry because she had drunk more wine than her health required without her husband's knowledge. Pliny and Aulus Gellius (X., c. 23) cite the authority of Cato that it was the custom for men to kiss their women relatives in order to detect the smell of wine in their breath, wine-drinking by women being regarded as disgraceful as adultery. To disguise the vinous odour in their breath, some women, as we learn from Martial, made an abundant use of pastilles (I. 88), or munched laurel leaves (V. 4).

At the banquets the matrons made it a rule to retire from the table when wine-drinking commenced.

In the later days of the Roman Republic and in the Empire inebriety became prevalent among women in all classes, and respectable women were no longer expected to leave the table when the wine appeared. Certain noble ladies, as we learn from Juvenal (VI. 425; IX. 115) and Martial (VII. 67), were particularly disgraceful in their excesses. Passages in Plautus ("Truculentus," Act V., Sc. 10), Terence ("Andria," Act I., Sc. 5), and Aulus Gellius (XII., c. 1, § 17) show that wine-bibbing was prevalent among nurses and midwives.

CHRONIC ALCOHOLISM IN CLASSICAL ANTIQUITY.

Most of the descriptions of inebriety in classical antiquity refer to acute alcoholic intoxication, but two writers at least, namely, Pliny and Seneca, have left pictures indicating the effects of chronic indulgence.

The following is Pliny's description: "Pallor, pendulous cheeks, bloodshot eyes, tremulous hands which spill the full cup, and as an ever-present penalty, sleep disturbed by the furies, restlessness at night, and lastly monstrous passions and even crimes which in their eyes have become the supreme delight. The next day wine infects their breath, and their memory is dead. This is what they call seizing life, whereas each day they lose both that day and the next" ("Hist. Nat.," XIV. c. 28).

The following description of chronic alcoholism in Seneca ("Epist.," XCV. 16) is quoted by Magnus Huss as one which in many respects exactly corresponds with the observations made many centuries later on the effects of over-indulgence in brandy: "The results are pallor, quivering of the muscles soaked in wine, and an emaciation due to indigestion and not to hunger. Hence the uncertain and tottering gait, and constant stumbling as if they were actually drunk; hence the swelling of the skin and distension of the belly, which has taken more than it can hold; hence the jaundiced and discoloured complexion . . . and the

nerves dulled and without feeling, or, on the other hand, constantly twitching. Why need I speak of the giddiness or the disturbance of vision and hearing and the insidious pains in the head?" Huss suggests that a later passage in the same letter refers to the condition of delirium tremens, where Seneca speaks of a class of fevers accompanied by a feeling of horror and much shaking of the limbs. These results of debauch, Huss concludes, were not very uncommon, because the description, though brief, was so true to life.

Indications of the existence of chronic alcoholism are also to be found in the account of certain celebrated Greek drinkers, some of whom received special nicknames, such as Xenarchus the Rhodian, known as "the nine-gallon cask" (Athen., X. c. 48); Diotimus the Athenian, called "the funnel" (*ibid.*), and a woman, Zopyra, nicknamed "the wine cask" (*ibid.*, c. 57).

In Roman mythology the demi-god Silenus, the fat, jolly old man riding on an ass in the train of Bacchus, may rank with Sir Victor Horsley's trio of John Bull, Father Christmas and Henry VIII. as an example of fatty degeneration due to chronic alcoholism (S. Paget, "Sir Victor Horsley," 1919, p. 234).

The accounts of contemporary historians show that several of the early Roman emperors were confirmed alcoholics.

Tiberius Claudius Nero, owing to his fondness for hot undiluted wine, was nicknamed by the soldiers Biberius Caldius Mero (Suetonius, "Tiberius," c. 42). Claudius (*id.*, "Claudius," c. 33) scarcely ever left the table until he had drunk to intoxication, and then he would immediately fall asleep lying on his back. While in this condition a feather was put down his throat to make him vomit. Vitellius (*id.*, "Vitellius," c. 13) had a face which was usually very red from hard drinking, and a big belly, and Commodus, who was in the habit of drinking until dawn and wandering through the taverns and brothels of Rome during the night, is described by Lampridius as having a dull expression as is usual with drinkers (Lampridius, "Commodus Antonius," c. IV.).

Reference may also be made to the individual mentioned by Burton, Offellius Bibulus, "qui dum dixit aut bibit aut minxit" ("Anatomy of Melancholy," Part I., Sec. 2, Mem. 2, Subsec. 2).

ALCOHOLISM AND SEXUALITY.

The passages in ancient Greek and Roman literature, especially the poets, illustrating the stimulating influence of wine on sexual activity, both in its normal and abnormal manifesta-

tions, are too well known to need more than a passing reference. In mythology this relation between alcoholism and sexuality is borne out by the ithyphallic representations of Dionysos, and by the story that Priapus was the son of Dionysos by Aphrodite. On the other hand, the paralyzing influence of excessive drinking on the sexual function was also noted by the ancient writers, as is seen from a passage in Athenæus (X., c. 45), who mentions the example of Alexander the Great, whose sexual frigidity is attributed to drunkenness, and quotes a passage from Aristotle's "Problems of Natural History," to the effect that the semen of drunkards becomes watery. Plutarch ("Quæst. Conviv.," III. v.) and Macrobius ("Saturn," VII., c. 6) also mention the sexual incapacity of men who drink much unmixed wine.

ALCOHOLISM AND PROSTITUTION.

The close and world-wide association between alcoholism and prostitution was as well exemplified in classical antiquity as it is to-day. The brighter and more alluring side of this association is shown in the lyric verse of Anacreon, the "Greek Anthology," and Horace, while its more sombre and repellent aspects, such as the bibulousness of the venal beauty in her decline, are a favourite subject for the Greek and Roman satirists, such as some of the writers in the "Greek Anthology," Martial, Juvenal and Petronius.

Among the many witty sayings made by courtesans Athenæus (XIII., c. 47) has preserved the *bon mot* of Gnathæna, to whom an undersized flask of wine was sent with the intimation that it was sixteen years old, when she remarked that it was very small for its age.

The inns of Greece and Rome, as Mitchell Banks points out in the introduction to his translation of Petronius, never played an important part in the social life of antiquity, because people of any consequence generally arranged to put up at the house of friends. Both the Greek *καπηλεῖον* and the Roman *taberna*, *caupona*, or *popina*, as we learn from several passages in Lucian ("Dialog. Meretric.," VI., IX., XI., XII.), Plautus ("Pænulus," Act II., Sc. 9; "Asinaria," Act III., Sc. 3; "Pseudolus," Act I., Sc. 2); Virgil ("Copa"), Horace ("Epist.," I. xiv. 21-6), Catullus (XXXVII.), Martial (VII. 61), Suetonius ("Nero," c. 27), and Tacitus ("Ann.," XIII., c. 25), were the resort of thieves and murderers, and were little better than brothels, as the women who served the guests not only entertained them with dance and music, but also prostituted themselves. Athenæus

(XIII., c. 21) quotes the orator Hyperides to the effect that if a member of the Areopagus were seen in a tavern, his colleagues would no longer tolerate him as a member of their body.

Iwan Bloch points out that the female flute and harp players, as well as the singers and dancers who were called in at the commencement of the Greek drinking bouts, were merely prostitutes, and quotes in support of this statement a passage from Plato's "Symposium," where the flute-players were dismissed, because the banqueters were resolved to engage in philosophic discussion and not to drink to intoxication. The Floralia, or Feast of Flora, which lasted from the end of April to the beginning of May, was regarded by Roman prostitutes as their special festival. Drunkenness at this time was the order of the day, as we learn from Ovid ("Fasti," V. 349).

The alcoholism of the prostitute in ancient Greece and Rome is of special interest as being the only form of industrial alcoholism existing in classical antiquity. Then as now alcohol was consumed in large quantities by these unhappy women, not only for its immediate pleasurable sensations, but also, and mainly, for its narcotic properties, in accordance with the observation of Parent-Duchatelet, who remarks: "All my information proves that they only begin to drink to deaden their feelings; gradually they become accustomed to it, and soon the habit becomes so strong that it prevents all return to virtue" ("De la prostitution dans la ville de Paris," 1857, i. 139).

DYSGENIC INFLUENCE OF ALCOHOL.

Although the influence of alcoholism in the parents upon the offspring is still a matter of dispute, the ancients appear to have been unanimous as to the effect of excessive wine-drinking in the parents on the future generation. In a work attributed to Hippocrates, though not usually regarded as genuine ("De Superfetatione," 30), the writer urges that a man should not be in a state of intoxication when he is begetting a child. Plato ("Leg.," II. 674) in a passage quoted with approval by Galen ("Quod animi mores corporis temperamenta sequantur," X. 458), recommends that men and women engaged in propagation should refrain from wine; and in another passage (*ibid.*, VI. 775) he remarks that "it is very important that children should be engendered by parents who are sober and masters of their reason. Now one can never know what day or what night a child is conceived by the help of the gods. The child conceived in a state of drunkenness will be of a bad constitution, and will not be strong either in mind or body."

It is a remarkable fact that the Carthaginians, though notoriously an alcoholic nation, rigorously forbade all wine to the newly married, so that the future generation should not be injuriously affected (J. B. Frank, "System einer vollständigen medizinischer Polizei," 1784, i., p. 519).

As illustrating the belief of the ancients that the drunkenness of the father was followed by the birth of a mentally defective child may be quoted the caustic utterance of the Stoic philosopher Zeno, who punished his pupil Aristo for talking in a random way by telling him that his father must have been drunk when he begot him (Diogenes Laertius, VII. 19).

For other references in classical writers to the dysgenic influence of inebriety I may quote the following passage from Burke's "Anatomy of Melancholy" (Part I., Sect. 2, Mem. 1, Subsect. 6): "If a drunken man get a child it will never have a good brain, as Gellius argues. *Ebrii gignent ebrios:* one drunkard begets another, saith Plutarch . . . and Aristotle himself . . . foolish, drunken, or hare-brain women most part bring forth children like unto themselves."

OTHER EVIL EFFECTS OF DRINK.

Other evil effects of drink on the individual and the community are emphasized by the Greek and Roman poets, philosophers, and miscellaneous writers. Several references are to be found to the relation of alcoholism to insanity, crime, and poverty. I have previously alluded to the saying attributed to Pythagoras, that drunkenness is a training for madness, and the effect produced on the Spartan King Cleomenes by drinking unmixed wine. Pontianus, one of the speakers in the Deipnosophists of Athenæus (X., c. 61), says that wine is the cause of drunkenness, madness, and all sorts of debauchery. Quarrelsomeness due to drinking, for which reason Bacchus is often likened to a leopard (*id.*, II., c. 7), as leading to crime and acts of violence, is repeatedly mentioned by Horace ("Od.," I. xviii. 8, xxvii. 1, III. viii. 15), Juvenal (III. 278, V. 25, XV. 47), and Propertius (III. 1). Pliny, in the celebrated chapter on drunkenness ("Hist. Nat.," XIV., c. 28), says that "no sweat, labour, or expense, nothing in short, has delivered us from having an object which deprives men of reason, produces in them fear, and makes them commit a thousand crimes."

The association of poverty and drink is alluded to in several epigrams in the "Greek Anthology," of which the following by Eratosthenes ("Anth. Pal.," VI. 77) may be quoted: "The drinker Xenophon has offered thee this cask, Bacchus. Accept it in a kindly spirit, for he has nothing else to offer thee" (*cf.* "Anth. Pal.," VII. 533; "Anth. Plan.," I. 15b).

Numerous allusions are to be found in the poets to severe accidents or deaths occurring to persons under the influence of drink. The earliest example is that of Elpenor, the companion of Odysseus, who, when heavy with wine, fell off a house-top instead of descending by a ladder, and so lost his life (Homer, "Od.," X. 552). Martial tells the story of a man who, in imitation of Elpenor, nearly perished by falling down a staircase on his return from dinner. "He would not," says Martial, "have run such a risk, O Nymphs, had he drank your waters only."

Many epigrams in the seventh and eleventh sections of the "Palatine Anthology" relate to men who had lost their lives as the result of drinking. In some of these cases death seems to have been due to acute alcoholic poisoning (VII. 454, 708), as the ancient Greek and Italian wine had a high alcohol content; while in others, especially those where death occurred after return from a banquet at night, pneumonia seems to have been the cause of death (VII. 398, 625, 660; XI. 12, 408). The liability of drunkards to contract an acute infection is further illustrated by a passage in Galen ("De medendi methodo," I., c. 7), where it is stated that drunkards are particularly prone to develop quotidian fever.

PREVENTION AND TREATMENT OF INEBRIETY IN CLASSICAL ANTIQUITY.

Various methods for the prevention of drunkenness, most of which are more or less fanciful, are mentioned by the ancients. The following classification is based on that proposed by Dr. W. L. Brown in the paper to which I have already alluded:

1. *Mixing Drinks.*—This was one of the simplest and most primitive methods. Wine was diluted with water and flavoured with more or less pungent substances, such as ginger, pepper, spices, or cheese.

2. *Wreaths and Ointments.*—The wreaths and crowns worn at banquets were not regarded merely as ornamental, but were supposed to possess a peculiar power in checking the intoxicating effects of wine. The favourite wreaths were those made of rose or myrtle. Cabbage leaves, ivy leaves, or violets were also used. The application of ointments to the head was supposed to check intoxication by preventing the fumes of wine rising upwards (Athen., XV., c. 45).

3. *The Drink Dress.*—The amethyst, as its etymology implies, was supposed to be a means of preventing intoxication (Plin., "Hist. Nat.," XXXVII., c. 40). Women wore amethystine clothes and jewels; and the amethyst was the favourite

ornament for drinking vessels until the time of Nero, who forbade its use (Suetonius, "Nero," c. 32). The amethyst was hung round the neck, fastened round the body, or taken internally with the object of preventing or curing drunkenness.

4. *Vegetable Agents.*—Certain vegetables, particularly the cabbage (Athen., I., c. 62; Plin., "Hist. Nat.," XX., c. 34), leek (Plin., "Hist. Nat.," XX., c. 21), and crocus (*ibid.*, XXI., c. 81), and vegetable oils, such as rue (*ibid.*, XX., c. 51; Galen, "De remed. parab.," III. 654), were regarded as safeguards against intoxication. Athenæus (I., c. 62), who quotes several passages from the Greek comic poets to illustrate this supposed virtue of the cabbage, states that wherever a vineyard has cabbages growing in it there the wine is weaker.

Bitter almonds as a preventive of intoxication are mentioned by several writers (Galen, "De remed. parab.," III. 654; Pliny, "Hist. Nat.," XXIII., c. 75; Plutarch, "Quæst. Conviv.," I. 6, 4). Plutarch in particular relates the story of a physician who lived with Drusus, the bibulous son of Tiberius, and easily excelled the others in the amounts of drink consumed until he was detected eating bitter almonds before a drinking bout. When prevented from doing this he soon succumbed to intoxication.

5. *The Mineral Cure.*—Certain substances from the mineral kingdom, such as powdered pumice stone and gold, were employed to prevent drunkenness. Pliny ("Hist. Nat.," XXXVI., c. 42) states, on the authority of Theophrastus, that in drinking contests the drinkers took powdered pumice stone, but ran considerable risks unless they swallowed enormous quantities of drink.

6. *The Water Cure.*—The simplest preventive, and one most commonly used to-day, is that mentioned by Pliny ("Hist. Nat.," XXIII., c. 23): "It is an excellent practice," says he, "on drinking wine to swallow glasses of water at intervals, and, even after leaving a meal, to drink water just taken from the spring, for fresh water immediately dispels drunkenness."

So much for the prophylaxis of intoxication. As regards the curative treatment, the consensus of opinion among the ancients, with the notable exception of Asclepiades, who was strongly opposed to the practice (Celsus, I., c. 3; Pliny, "Hist. Nat.," XXVI., c. 8), was that vomiting was indicated, being so prescribed by Hippocrates ("De Dieta," III. 68); Galen ("Hippocr. de humor. lib. et Galen.," comment I., xii. 527), Oribasius and Paulus Ægineta.

The passage in Oribasius, which is copied by Paulus Ægineta, runs as follows in Adams's translation (Paulus Ægineta, vol. i.,

p. 43, Sydenham Society) : "To those who are intoxicated, vomiting is an immediate relief. It will be proper that they drink freely of water and honeyed water, so that they may vomit freely and remove weary feelings." Commenting on this passage, Adams illustrates the habit of taking an emetic after a debauch by references to the Acharnians of Aristophanes, and the practice of the Roman Emperors to which I have already alluded.

According to Athenæus (XI., c. 67), the Athenian physician Mnesitheus recommended that after the drunkard had been made to vomit more or less copiously he should take a hot bath, and then go to sleep. The use of a hot bath in the treatment of intoxication is also advised by Hippocrates ("De Morbis," II. 22), and is described in a passage of Petronius (c. 73).

Among the more fantastic remedies for intoxication is the one mentioned by Galen ("De parab. remed.," III. 654), consisting in the administration of hot grapes and wine in which an eel had been suffocated, which we may well imagine would have an excellent psychotherapeutical effect.

ANCIENT AND MODERN ALCOHOLISM COMPARED.

In conclusion, I should like to draw attention to some points in which the alcoholism of classical antiquity differed from that of modern times. In the first place, alcoholism in ancient Greece and Rome had not permeated all ranks of society, as it did in later times, but was almost entirely confined to the upper classes. Apart from the public festivals, especially the Dionysia and Floralia, only a few passages, such as Horace, "Sat." I., v. 15; "Epist." I., xv. 24; Plautus, "Amphitryo," Act I, Sc. 1, 433; Tibullus, I., xi. 51-2; and Martial, XII. 76, suggest the occurrence of inebriety among the common people, as well as among the slaves, but the habit does not appear to have been widespread. Otherwise, as Grotjahn remarks, contemporary writers would not have failed to allude to it. The absence of alcoholism among the lower orders is all the more remarkable as the debased proletariate in ancient Rome in particular presented an exceedingly favourable medium for the spread of inebriety.

The absence of drunkenness among the lower classes is connected with the fact that alcoholism in classical antiquity was almost exclusively of a convivial character, and that industrial alcoholism, apart from that associated with prostitution, did not exist. Moreover, as Grotjahn points out, the needs of the masses for amusements in ancient Rome were satisfied by the sensational exhibitions provided in the circus.

Secondly, the absence of legislation dealing with drunkenness, or control of the liquor traffic, is another point of contrast, which

shows that inebriety was not generally regarded as a political and economical evil. It is true that a few legislators in the early history of Greece and Rome had made some laws relating to inebriety. Thus, Lycurgus the Spartan not only prohibited drinking except for the purpose of quenching thirst, but cut off the legs of drunkards and destroyed all the vines he could. Zaleucus, the Locrian lawgiver, enacted the death penalty on anyone who drank pure wine except by order of a physician (Ælian, "Var. Hist.," II., c. 37), and Pittacus inflicted a double penalty for crimes committed in drink (Aristotle, "Pol.," II., c. 12). I have previously alluded to women being forbidden the use of wine in the early days of Roman history. These, however, are merely isolated examples of anti-alcoholic legislation, almost before the dawn of the classical period.

The third distinguishing feature of alcoholism in classical antiquity, and perhaps the most important, is the absence of distilled liquors, which were not introduced until the fifteenth century. Alcoholism in ancient Greece and Rome was almost entirely due to over-indulgence in wine, the consumption of beer being confined to barbarian races. In this connection it is interesting to note that, according to a recent communication to the Académie de Médecine by Professor Marcel Labbé (*Bull. de l'Acad. de Méd.*, 1926, 3e sér., xcv., 480), wine represents the principal source of alcoholism in France at the present day owing to the much smaller consumption of spirits.

Fourthly, the absence of syphilis in classical antiquity is another important difference, in view of the fact that alcohol is such a frequent incentive to exposure to infection, and considerably aggravates the disease after it has been acquired.

SUMMARY.

1. Our knowledge of alcoholism in classical antiquity is derived mainly from a study of the lay writers, such as the poets, philosophers, moralists, and encyclopædists, especially Pliny the Elder and Athenæus.

2. Though there is some indication of the existence of chronic alcoholism, as is shown by passages in Pliny and Seneca, alcoholism in classical antiquity was mainly of a convivial type, and industrial alcoholism, apart from that associated with prostitution, was unknown.

3. Numerous passages in the classical writers deal with the dysgenic influence of alcohol and other evil effects of drink on the community and the individual, especially the relation of inebriety to insanity, crime, and poverty, and the measures

recommended by the ancients for the prevention and treatment of intoxication.

4. Alcoholism in classical antiquity differs from that of to-day by its predominance among the upper classes, the lack of legislative control, the absence of distilled liquors, and the non-existence of syphilis.

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